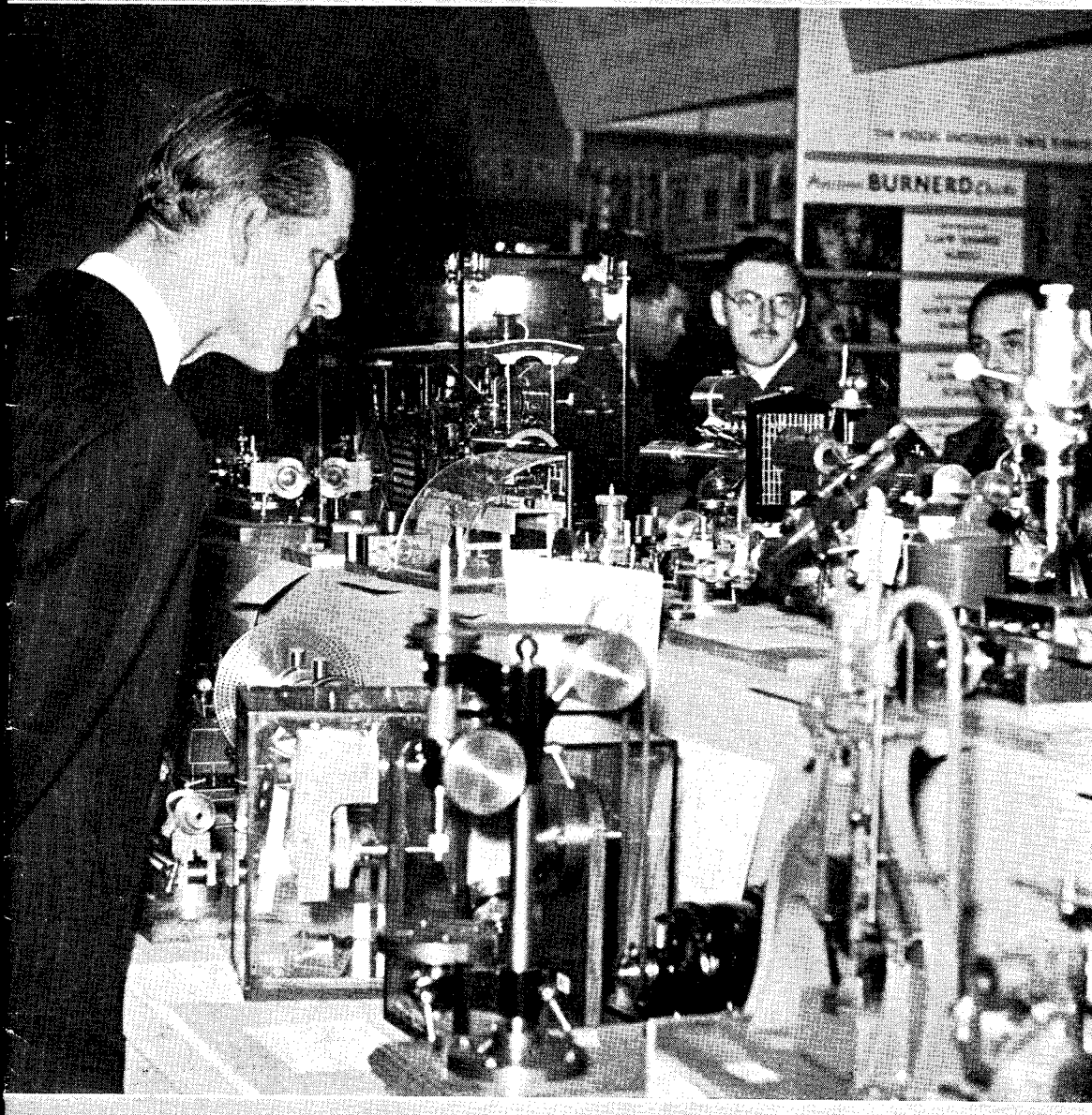
THE MODEL ENGINEER



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The MODEL ENGINEER

PERCIVAL MARSHALL & CO. LTD., 23, GREAT QUEEN ST., LONDON, W.C.2

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SMOKE RINGS

Our Cover Picture

● IN HIS speech when opening the "M.E." Exhibition, H.R.H. the Duke of Edinburgh said that he liked looking at models, and knew that he would find the best at the exhibition. Our cover picture shows, quite clearly, that he meant what he said, and is typical of his very keen interest in all that he saw during his tour.

Models Lead the Way!

● THERE ARE always many examples of progressive thought and inventiveness to be seen in models shown at the "M.E." Exhibition, but this characteristic was more in evidence this year than ever before. Apart from the many applications of radio control in model aircraft, ships and land vehicles, all of which incorporate individual ideas, and are fully in keeping with the most up-to-date research in this subject, there are many other models, in the mechanical and other sections, which show that model engineers never rest content merely to follow full-size practice, but are often ahead of it. Such exhibits as the electronic organ, the "gearless" electric clock, and the three-cylinder split-single marine engine show distinctly new trends in mechanical and electronic design. In the sphere of machine tools and appliances, ingenuity is displayed in the miniature jig borer, the propeller pitch generating machine, and various accessories such as dividing heads, slotting and vertical milling attachments; a small but vital detail on one of these devices is an entirely new self-adjusting guide key in a cylindrical slide. These are but a few of the ways in which model engineers are tackling full size problems, and making a real contribution to engineering progress.

Motor-cars at the "M.E." Exhibition

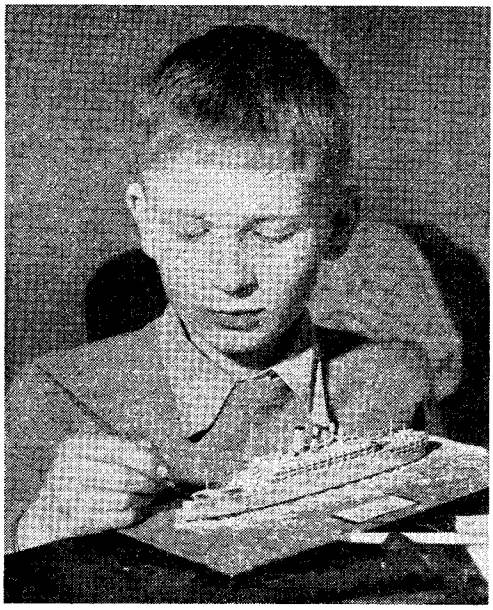
● THE MOTOR-CAR as a prototype for modelling seems to attract many people; at almost every "M.E." Exhibition since 1946, there have been some more or less interesting examples of miniature cars, and this year's show was no exception. The model car that most attracted our attention was a 2-in. scale Sunbeam-Talbot of excellent construction. Its bodywork was nicely fitted and finished outside, and the car was accurately and completely equipped inside. Its present engine is not powerful enough to be altogether satisfying, and we learn that a much more powerful unit is to replace it. We look forward to seeing this car working some day.

This was a long way from the opposite extreme, which was merely a small piece of wood shaped

and painted to resemble a racing car ; it was little more than 2 in. long, and we wondered how and why it had come to the " M.E." Exhibition ! True, it possessed a nicely-contrived little dashboard and steering wheel, but it came far from justifying the comparatively grandiose description in the catalogue, even if it was the work of a competitor of very tender years.

Team Exercises

● THE NOVEL idea of the Redditch and District Model Engineering Society, in entering a collective exhibit in the " M.E." Exhibition, consisting of ten drilling machines of identical design, built by individual members of the society, is one which can be commended as a means of assisting novices



Master B. Brooks with his water-line model of R.M.S. " Orion "

to acquire skill and experience, by working on such a project under the supervision of more experienced members. The design, drawings and patterns were produced in the society, and the members who built these machines include an optician, an apprentice dental mechanic, a van driver, a linotype operator, a bank clerk, a shopkeeper and an apprentice electrician. We learn that the next communal project of the society will be the construction of lathes, a design having already been prepared and pattern-making put in hand. The selection of machine tools as an exercise is a very wise one, as the members will, in addition to obtaining a good training in all-round engineering craft, undoubtedly find the finished product useful afterwards ; but the same principle may well be applied to the construction of models. A member of a well-known model power boat club informs us that they have started a scheme for instructing junior members in the construction of a " one-class " cruising hull and power plant. It is intended to judge the results obtained in a contest between the finished boats, which should be an excellent test of the workmanship put into them. Other clubs who are interested in schemes for training beginners would do well to follow these examples.

Our Youngest Exhibitor

● AT THE recent " M.E." Exhibition, the youngest exhibitor was Master Bernard Brooks, aged 9, of Benfleet, Essex, who exhibited a water-line model of R.M.S. *Orion*.

This, as our picture will show, was a very praiseworthy effort, the general proportions and appearance of the original being faithfully rendered. The model was made as the result of a visit to the ship. Bernard's father made the plans, but the actual making of the model is entirely the boy's own work. The model is made of wood and cardboard, and is mounted on a sea which is realistically moulded and painted. Modelling must be in the family, as Bernard's father also had a model in the Exhibition, this being of Barking Abbey, a very nice piece of craftsmanship, involving a considerable amount of research. Bernard also has a younger brother, David, aged 5, and in a photograph we have he is seen holding a model of a church he has made. Perhaps he will exhibit next year at the age of 6, and then we *will* have a record.

SOS from Birmingham

● THE NATIONAL Locomotive Rally held at Campbell Green, Birmingham, on September 6th and 7th last and reported in THE MODEL ENGINEER for October 16th, was badly spoiled by foul weather. The Birmingham Society of Model Engineers has asked us to pass on the following urgent message to all clubs which have taken part in the rally :—

Would each club discuss the question of a possible date for 1953 and put forward any suggestion for improving the event ? By notifying Birmingham's hon. secretary of any decisions, *as soon as possible*, a final date for next year's National Rally can be decided by popular choice. Earliest possible attention to this matter is desirable so that the whole of Birmingham's summer programme for 1953 can be arranged. The hon. secretary of the Birmingham S.M.E. is Mr. R. Phillips, 92, Gilberstone Avenue, South Yardley, Birmingham, 26.

Exhibition at Kirkintilloch

● MR. A. C. STEWART, hon. secretary of the Kirkintilloch Model Makers' Club tells us that the club is actively preparing for its exhibition which will be held in the Town Hall, Kirkintilloch, on Friday and Saturday, November 28th and 29th. Among the exhibits will be : A 7¼-in. gauge Gresley 4-6-2 locomotive ; several 5-in., 3½-in., 2½-in. and " O " gauge steam locomotives ; aeroplanes ; ships ; machine tools, etc. A " O " gauge model railway, a car racing track, a display of hot-air engines and a continuous film show will be other attractive features.

My Impressions of "The Model Engineer" Exhibition

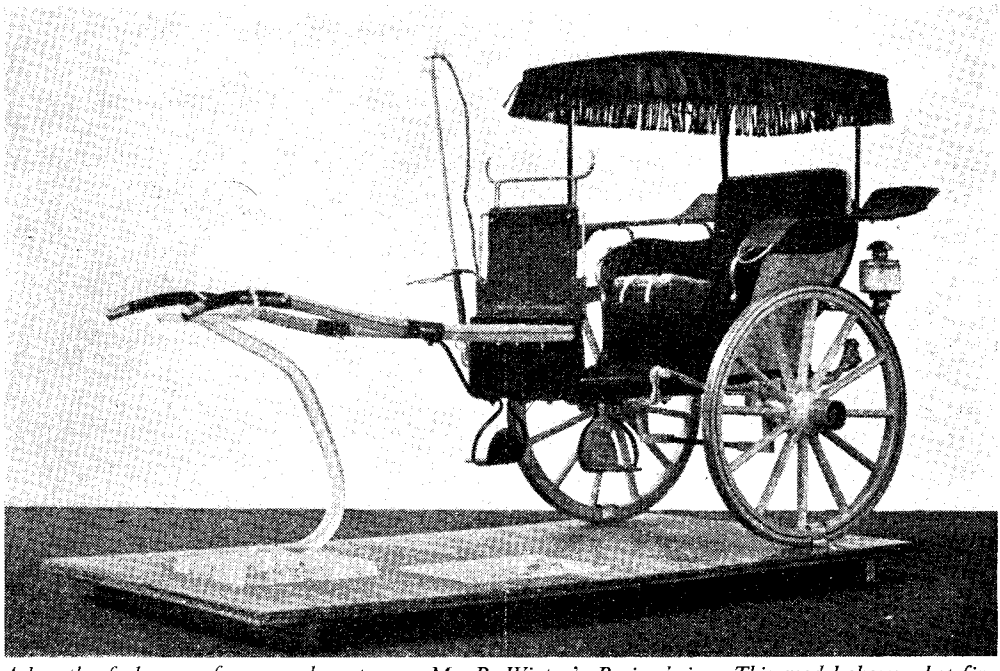
by

Lawrence H. Sparey

LIKE most other people, I am one of those fortunate ones that can really enjoy "The Model Engineer" Exhibition, because I have no specialised knowledge of the models I am looking at. By this I mean that I am not disturbed by details that would drive an expert to distraction. I neither know nor care if there are a couple of rivets too many in a traction engine boiler; nor am I familiar with the finer points of a Weir pump. A little learning may, indeed, be a dangerous thing; too much may often be a nuisance.

Thus freed by this charming ignorance from the cares of the expert observer, I was at liberty to roam at will, noting those things which pleased me, and avoiding those which did not, with complete disregard of the academic points. My interests and observations will doubtless differ from those of the experts and judges, but may, I think coincide with those of the average visitor anxious only to enjoy a jolly good show.

At exhibitions of this sort one's attention is always first attracted by the super exhibits; those amazing examples of skill and patience that leave me gasping; the triple expansion engine by Mr. J. Kay, championship winner in 1948; Mr. I. W. Marsh's tea clipper *Sir Lancelot*; and Mr. Nettleton's famous clocks. Many well-known examples of championship form were there to see, and I inspected them with due



A breath of elegance from an elegant age—Mr. P. Winton's Paris chaise. This model shows what fine workmanship, finish and scaling can do with a good prototype

reverence. Yet, I must confess, these prodigious efforts rather frighten me. They cast such shadows on my own productions. One can but stand and worship, for their very perfection makes them remote from me—like bishops and beauty queens.

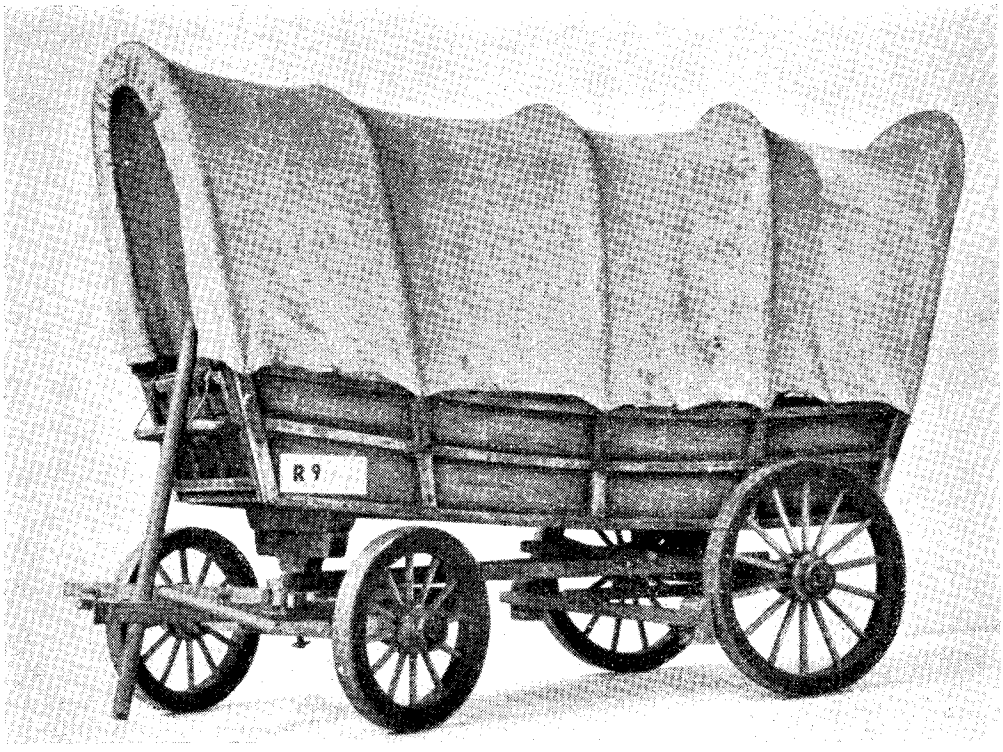
It is among the rank and file that I am more at home, and, when at last one can turn attention from the lions of the show, a surprising field of interest, craftsmanship and variety is discovered. The carpet loom by Mr. R. C. Porter of Axminster is an outstanding example, which may, perhaps, be in the prize-winning class. Mr. Porter, I understand is himself in the carpet manufacturing trade, and one can only conclude that he is happy in his work! I enjoyed this model very much, because it instructed me as well as pleased me. Another exhibit which I enjoyed for the same reasons was the 1 in. scale colliery electric winding engine, by Mr. F. Smith of Nottingham. While I am familiar with the steam winding engines, having visited several pits in the north, I have not seen an electric edition before.

At this point my attention was taken by a bright little effort farther along the stand. This was the delightful lady's Paris chaise, by Mr. Winton of Wembley. Models of horse drawn vehicles have, for some reason, to be very good to be convincing, and few seem to make the grade. Mr. Winton's exhibit was, perhaps, the most pleasing of its type that I have ever seen. It looked real. The leather work and upholstery was a lesson, and the paint work conveyed just the impression of quality that made the carriage trade famous.

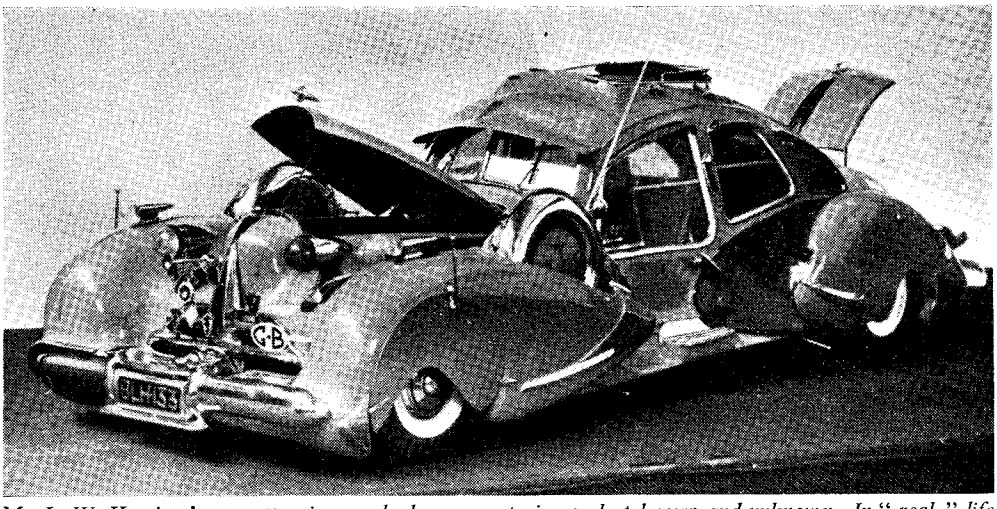
Another vehicle to which I returned several times was the Prairie Schooner, a four-wheeled covered wagon by Mr. F. Upton of S.W. London. Here, again, it was the finish that made the model. The weather-beaten appearance was perfect, and one could almost feel the drenching rains and the blistering sun, as we lurched our way towards new lands.

Returning from the transport of the past to that of the present, several examples of the modern motor car were to be seen. A most imposing model of an "ultra" touring saloon was presented by Mr. L. W. Harrison of London, and I feel that one would have to drag away any American film star, or heavyweight boxing champion, by main force from it! The painstaking workmanship on this exhibit was apparent, but what a pity that the paintwork let it down so badly. One feels that Mr. Harrison had an accident here, and had not the time to rectify it before the show.

On the other hand, a model which certainly suffered no accidents was Mr. F. H. Buckley's 1/6th scale M.G. car, which all motoring fans cannot fail to have admired. This was one of those models wherein the greatest pleasure lies in close inspection of the details.



When men were men! The toughness of a hardy race and time was captured perfectly by this prairie schooner by Mr. F. Upton



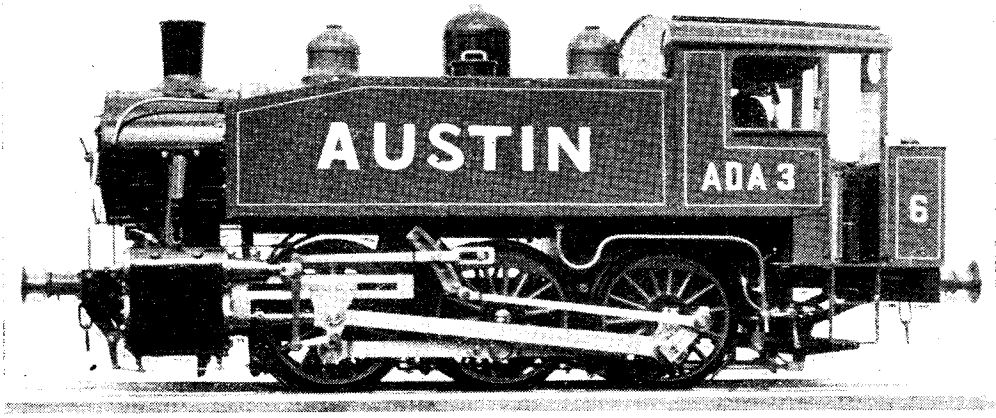
Mr. L. W. Harrison's super touring car had every motoring gadget known and unknown. In " real " life this car would have won any " Concours d'Elegance " from the Monte Carlo Rally downwards

On this same stand were displayed some examples of machine tool construction, and there were quite a number that I should have liked in my own workshop. Had supervision not been so strict, I might now possibly be possessed of a universal gear cutter by Mr. L. R. E. Beale, of London, together with his watchmaker's lathe, though I think that the weight of Mr. Bowyer-Lowe's vertical milling attachment, and his slotting attachment for a " Pool " miller, would have increased the risk to an unprofitable extent. Similarly with the ten drilling machines, exhibited by the Redditch and District Model Engineering Society—all of them identical except for colour, and, one must say it, workmanship and finish. No prizes are offered to the Redditch members for discovering which drills I mean.

In this section one must mention the combined jig-borer and vertical milling machine by Mr. G. D. Reynolds of Farnborough. This seemed a most workmanlike and practical proposition, and I am sure many must have looked upon it with envy.

The popularity of Mr. Turpin's dividing head was shown by several examples, notably that of Mr. W. D. Urwick of Taplow, and Dr. A. N. Barker of the S.M.E.E. It is interesting to note that while the fundamental design was followed in all cases, the exhibits varied considerably in detail, which I take as a good sign of revolt against the slavish following, to every nut and bolt, of published designs.

My impression was that the machines and tools shown this year ran more towards novelty than of yore, and as an example we may cite the experimental machine for cutting marine propeller patterns, shown by Mr. C. H. Toogood of Sudbury. One cannot help feeling, however, that



The solid dignity of Mr. J. K. Strickland's 0-6-0 *tank engine explains why the model locomotive will always be top favourite with model engineers*

unless it is to be used professionally, it is rather an elaborate arrangement for amateur requirements. Nevertheless, it is an interesting model, and gave me much pleasure.

In this tool section I was much puzzled as to whether many of the exhibits were actually intended for use or simply as miniatures. As a case in point, I could not make up my mind whether the beautifully made little machine vices —about an inch long—shown by Mr. E. V. Elderkin of Ruislip, were really a working proposition. Larger tools by this builder were obviously working models, but I could see very little practical application for the smaller.

My one criticism of the excellent display of amateur-made tools is a strange one. All of them seem too highly finished for comfort. I should be scared to use them.

It was at this point that I came across the little case of cricket bats exhibited by Mr. W. Lucking of Robertsbridge. This type of exhibit is one of the things that made " The Model Engineer " Exhibition such a store of surprises. These bats, to 1/4 scale, showed the evolution from the weapon of 1750 to that of the present day, and they are to be commended as an instructive and well-made exhibit. I wish there had been more of this type of thing. My general impression was that the wooden models, rather disappointing in the past, have improved wonderfully.

In this connection, I wonder how many visitors noticed the tiny glass case containing a woodworker's bench and tool kit. This type of model is probably one of the most difficult of all to make convincing, and Mr. S. Haill of London has succeeded admirably. So often, alas ! these tiny exhibits pass unnoticed.

It was, in fact, in the " communal " glass cases at the foot of the dais that I found some of the greatest interest and pleasure. Who, for instance, could pass the case of ½-scale duelling pistols of 1820, by Mr. J. W. Thomas of Whitchurch, without admiration ? Or the small spinning wheel by L. Parten of Reigate ? These " communal " cases contained examples of some of the finest workmanship, irrespective of size, in the whole exhibition.

" The Model Engineer " Exhibition is synonymous with model locomotives, and, as one would expect, here was the cream of them. A full description will be left to the experts ; meanwhile, it was interesting to see Mr. J. Austen-Walton's *Twin Sister* in the flesh, as it were, after following her fortunes in THE MODEL ENGINEER for so long. Another locomotive which I liked greatly was the 5-in. gauge 0-6-0, by Mr. J. K. Strickland of Birmingham. This engine provided something to look at and study closely.

In looking at the 3½-in. gauge 0-6-0 contractor's type locomotive by Mr. L. R. Raper of Wakefield, one was up against the old problem of whether a model is a " showcase " effort or not. It seems rather hard that any locomotive showing signs of such excellent finish should be suspect, and close inspection showed no reason why this charming model should not be as good under steam as under glass. You have something worth looking at here, Mr. Raper.

So have you, Mr. Dudley Harris of West Wickham, in your model of a London and North Western "Crewe" type locomotive of 1851. Though I understand from the experts that there are certain things, like out-of-scale rivets, which do not meet with approval, this locomotive appealed to me greatly, and I like it. Pity about the rivets, though !

Model locomotives naturally lead us straight to the S.M.E.E. track where, after last year's absence, we could once again smell the delights of burning coal and hot oil. Great interest centred around the new portable track, making its first public appearance. This track is probably the finest—and most expensive—portable track in existence, and I understand that its 100 ft. run cost over £200. Clubs with lesser finance must have looked with envy at its cast aluminium supports and bedplates. Here bustled the enthusiasts, in greasy overalls and peaked, enginemen's caps, tending their charges with professional efficiency. I rather thought that could the caps be scaled down—say, 1 in. to the foot—it would add not only to the gaiety, but to the " model " aspect of the scene.

The stand of the S.M.E.E. had plenty worth looking at, and I trust visitors did not miss Mr. D. H. Chaddock's steam turbine. This model is probably unique, and has, I learn, already done 250,000 r.p.m. under flash steam ! No, this is not a printer's error.

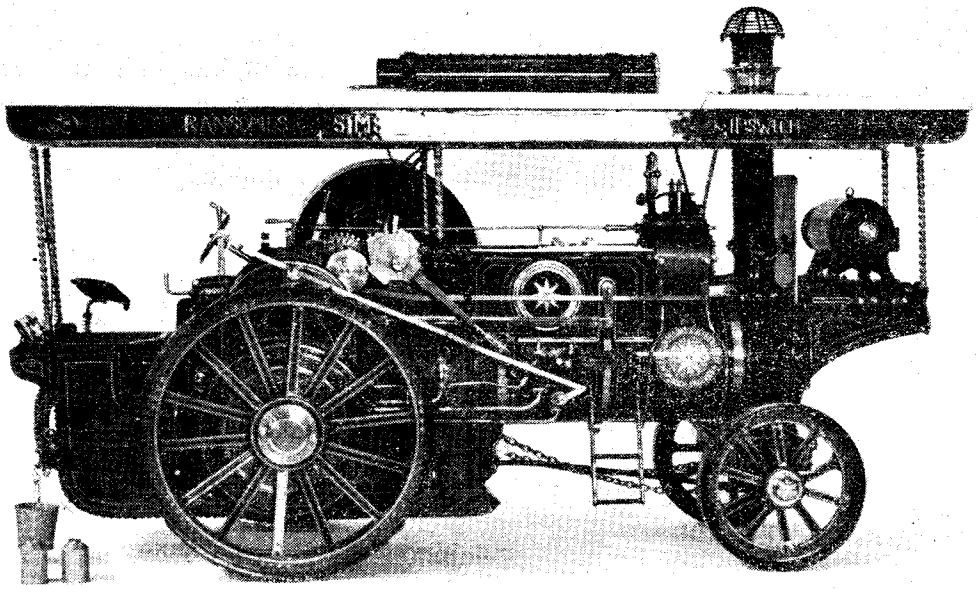
Other worth-while exhibits on this stand, were the oscillating wall engine, built by Mr. Tidy from illustrations in an old catalogue of 1870, and the compound Tandem Mill engine by Mr. F. P. Orchard. This layout is one of the most complete I have yet seen, with air condenser, circulating pumps, and all other details.

As a foil to the bustle of the railroaders I made my way to the quiet dignity of the boat section, there to find, as always, the best finished models in the show. If only model engineers in general could be persuaded to discover just how these boat men put paint on so beautifully. Did you see the 1 in. scale radio controlled launch by Mr. H. R. Clayton of Chalfont St. Peter ? Or the paintwork on Mr. K. W. Chappell's hydroplane ?

On this stand was one of the most charming exhibits of the whole exhibition, a scenic representation of an admiral's barge at an oriental quayside. Rarely have I seen a more charming picture, and visitors will recall the lifelike appearance of the tiny sailors and natives, and the beauty of the whole scene. Thanks Mr. C. A. Chapman.

In the interests of my pocket I kept away from the trade stands for as long as possible, but finally the lure of good tools and accessories overcame me, and I soon became a poorer but, I think, happier man. One was glad to see several newcomers, and, of course, to renew acquaintance with the old. I should, however, have liked to see more suppliers of raw materials—that great model engineer's problem of today—yet we must be thankful to the odd one or two who were there to help.

It is a cheerful sign that there were several new lathes and other machines at the exhibition, and I was glad to inspect the Hobson 3½-in. machine, which seems to be the first serious attempt to supply a geared-head lathe at a price



A showman's engine that made a good show. The opportunities offered by this type of model are fully exploited by Mr. A. J. Kent—perhaps to the despair of his lesser skilled brethren !

that the amateur can afford. The Granville lathe widens the choice for modellers, and the new Myford " Super 7 " seems to be a sure winner.

Not the least interesting stand was that of the Royal Navy, situated, appropriately enough, next to the boating tank. Here could be seen a scenic model of a commando beach landing, which could hardly be bettered for realism. The sea, beach and cliffs were excellent, as were the tiny figures of the commandos scaling them.

So, with the usual aching feet, I made my way homeward, and as I went I wondered if the things I had seen were too near to me in time for a correct impression to be formed. It will be interesting to see what things I remember when six months have passed me by, and I am no longer somewhat bewildered by a surfeit of splendours. Meanwhile, I thank the builders of the outstanding models for once more putting me in my proper perspective, and the lesser lights for giving me a most enjoyable visit.

Salter's Steamers

Few Englishmen, we imagine, do not know the River Thames, but we doubt if more than fifty per cent of them could claim that they are really intimate with it. Those who are, however, usually love it, and for various reasons ; it is one of the most distinctive of rivers, demanding respect and even affection from those of us who take the trouble to make ourselves fully acquainted with it. It has its moods, certainly, and it has its special features ; among the latter, few can be better known than the delightful little steam launches owned by Salter Brothers, of Kingston ; from May till September, these little steamers ply from Kingston to Henley and from Henley to Oxford, providing a regular service which must be known to millions of people. *Marlow, Reading, Mapledurham, Sonning, Hampton Court*, to name only some of them, are symbolic of high days, high summer and holidays on the upper reaches of the Thames.

These steamers, however, will not be steamers for much longer, for they are to be converted to diesel drive ; in fact, *Hampton Court* is one that has already been converted. Her appearance has not been much altered, the only noticeable change being the absence of the once-familiar white funnel with the narrow polished brass band round its top. And yet, what a change this is ! It completely alters the whole character of the trim little boat.

So Salter's Steamers, like most other things must succumb to the exigencies of the times ; drivers and stokers for the old steam engines are no longer to be found ; something rather more automatic and self-propelling must be provided to keep the little boats at their work. Their 1952 season has finished, and they are now at their depots for overhauling and refitting during the winter months, so that they may be ready for the 1953 season. By then, they may have been dieselised ; but we venture to make the suggestion that one may be left as a *steamer*, if only because of the wide interest she would arouse. We are certain that, if need be, a volunteer crew would be readily found to manage her whenever she was put into service. Alternatively, could not the distinctive funnel be left on one of the dieselised boats ?

Seen at ME

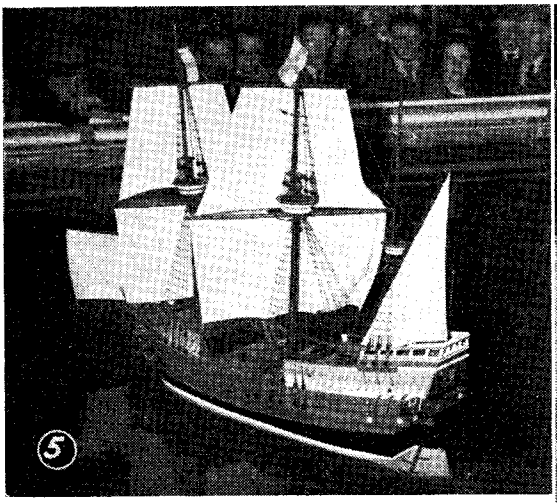
THE MODEL ENGINEER Exhibition

(1) *An impromptu recital by Mr. Ian Bradley on the electronic organ built by Mr. C. C. Clarke, of Welwyn Garden City*

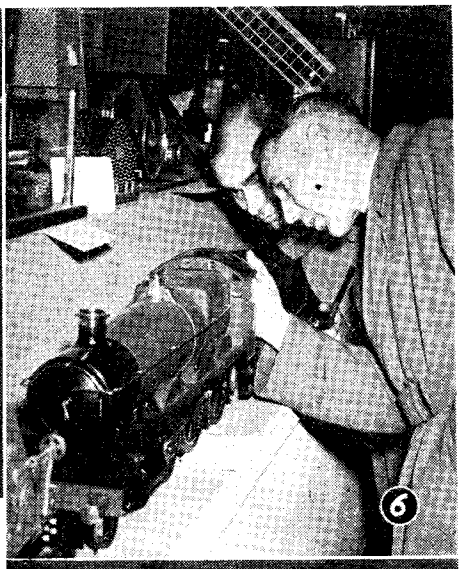
(2) *Raymond Baxter, the B.B.C. commentator, discusses one of the S.M.E.E. locomotives with Mr. R. Coffin*

(4) *A demonstration by Mr. A. T. Tamplin's 1/6-scale radio-controlled Churchill tank, which has undergone certain alterations and additions*

(3) *A view of the pits on the Grand Prix racing track*



(5) *New wine in an old bottle ! A radio-controlled galleon by R. Greenfield, of West Bromwich manoeuvring on the marine tank*



(6) *Two visitors admire a fine 5-in gauge G W.R "Saint" built by Mr. P. F Arnold, of Slough*

(7) *A demonstration of violin-making by Mr. Clifford A. Hoing, of High Wycombe*

(8) *Charles Gardner, B.B.C. Air Correspondent, broadcasting a description of the model aircraft exhibits*

(9) *Mr. C. H. Phillips, of Fulham, demonstrates the construction of model aircraft*

A Cross-Slide Extension Bearing and Index

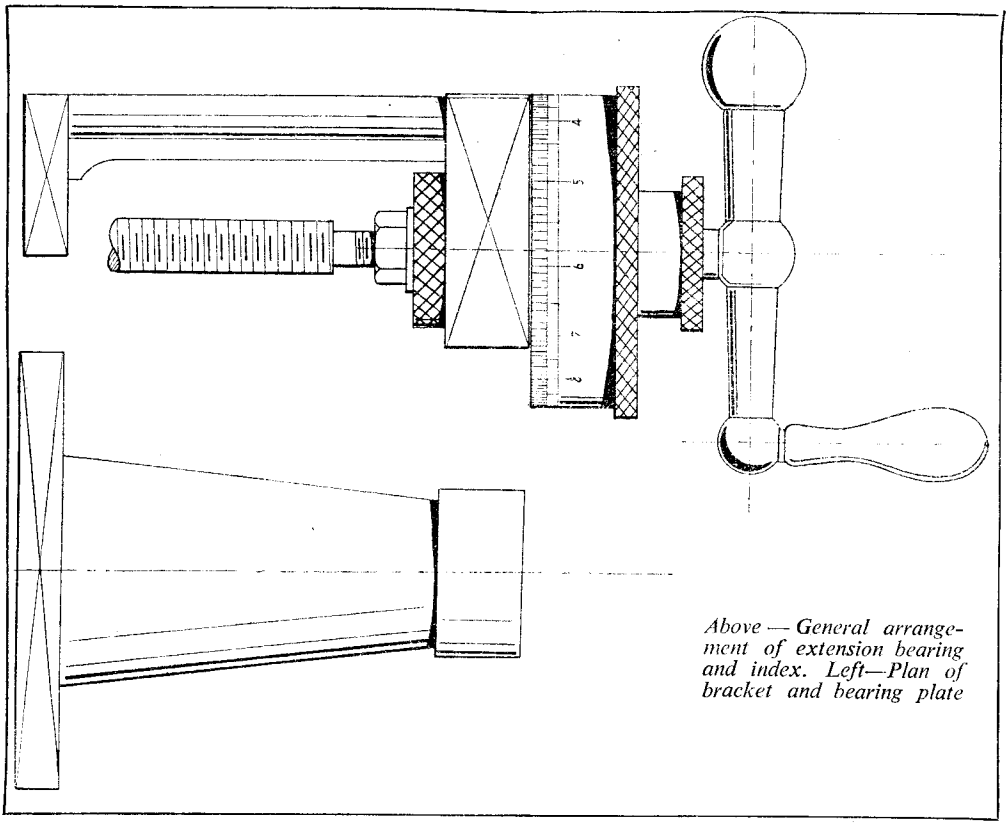
by H. A. C. Hunt

HAVING often felt the need for an extra inch or so of travel on the cross-slide when carrying out milling operations in the lathe, it was decided, when recently considering a new cross-slide index for my "Zyto" 3⅜ in. lathe, to go the "whole hog" and design an extension bearing for the feedscrew. In designing this, the following features were considered desirable:

(*a*) Provision was to be made for adjustment of the backlash without having to remove the index dial, etc.

(*b*) The existing feedscrew to be retained, as no fixed steady was available for use while machining a new one.

The accompanying drawings show my attempt to design a satisfactory attachment incorporating these features.



Above — General arrangement of extension bearing and index. Left—Plan of bracket and bearing plate

Backlash Adjustment

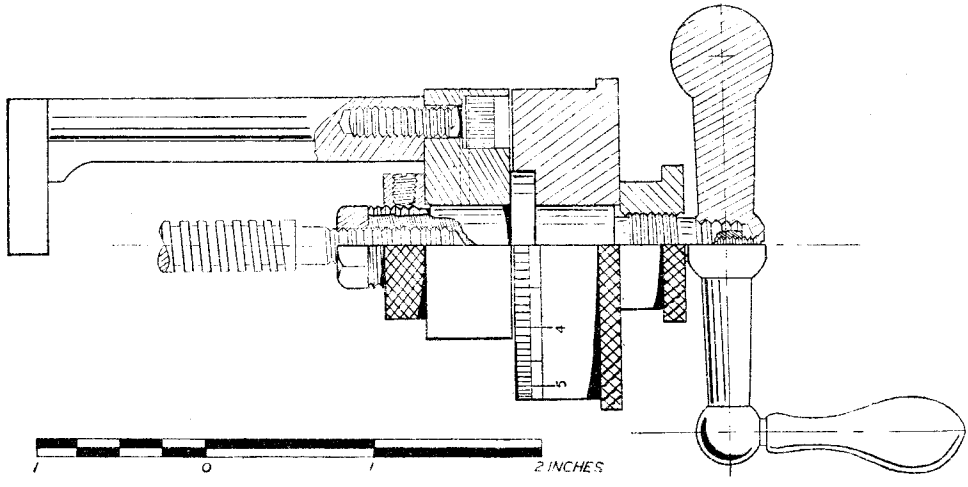
It will be seen that the backlash adjustment is effected by means of a knurled collar which is internally screwed ½ in. × 32 t.p.i., and is locked by means of a 3-B.A. brass grub-screw. Brass was used for the screw instead of the usual steel screw and separate brass pad owing to the rather restricted length available through the collar.

Feedscrew

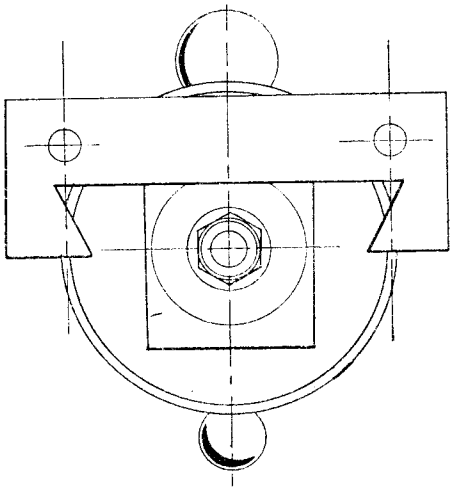
The feedscrew was adapted for use in the attachment by screwing on to it an extension spindle which carries the backlash adjustment collar, index dial and lock-nut, and the operating handle. This extension is locked into place by means of a ¼-in. B.S.W. nut.

Extension Bearing

This is in two parts, an extension bracket and a bearing plate, which are held together by means of two $\frac{5}{16}$-in. Allen screws. The bracket portion was cut from 3-in. × 3-in. × ⅜-in. mild-steel



Part section, showing construction



End view, showing bolting face

angle and the bearing is made from 1-in. × ½-in. mild-steel flat.

In order to ensure that the feedscrew would line up correctly with its nut, the following machining procedure was adopted. Having machined the outside faces of the mild-steel angle, the top face was sawn and filed to shape and the bearing plate attached. The vertical face of the bracket was then marked out and the bolting and bearing holes drilled, using the cross-slide keep-plate as a template.

The assembly was then mounted on a stub mandrel (which was made a tight fit in the bearing hole) and locked into place by a nut screwed on to the forward end of the mandrel. The bearing plate was then centre drilled and the tailstock brought up to support the bracket while machining the radius on the top of the plate. This radius is machined to $\frac{15}{16}$ in. to coincide with the index dial. Finally, the fixed index mark was cut and the bearing hole drilled and bored, using very light cuts.

Some doubts were felt about this method of machining, as it was thought that the assembly would probably be distorted by the pressure during drilling and thus not line up correctly on final assembly, however, all was found to be well.

The final operation was to mark out and cut away the centre of the bolting face to clear the slideways, and then bring the assembly to a high finish with various grades of emery cloth and a final polish on the polishing mop.

For the Bookshelf

Model Making as a Career, by T. W. Hendrick, A.M.Inst.B.E. (London: Percival Marshall & Co. Ltd.) 72 pages, size 4¾ in. by 7¼ in. Illustrated. Price 5s. net.

This is a welcome little handbook of advice, primarily to those who wish to take up model making as a means of livelihood. The foreword is by Sir Stephen Tallents, K.C.M.G., who writes of his own observations and experiences, leading admirably to the author's detailed and timely advice in the ensuing eleven chapters.

The author begins by reviewing the various types of models for which there is always a demand, and then, in eight chapters, discusses such matters as: producers of models, workshops, craftsmen, how the aspirant is affected, getting into touch with producers, how to show work, prospects, and finally, a career for girls.

It is a friendly, helpful little book which should be of use and interest many readers.

The Restoration of a Cuckoo Clock

by A. O. G. Usmar

THESE clocks have never attracted the attention of writers on clock matters ; perhaps they have never quite acquired a respectability, because they are a whole family of clocks, ranging from those crudely constructed with wooden plates, through many stages to the modern mass-produced patterns. But in their highest development they appear to be hand-made, which, together with their prettily carved cases, conjure up a picture of little family workshops in picturesque continental villages of days long gone ; and, as examples of an art which has had to make way for other things, they deserve more attention than they have received.

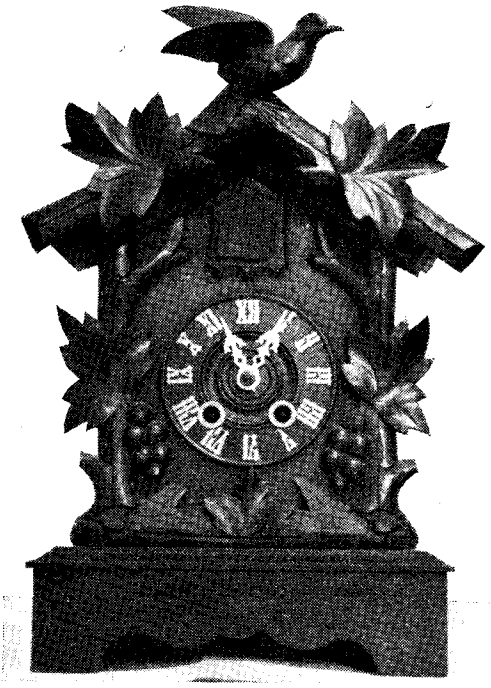
This clock is a fine specimen of craftsmanship ; the plates have been cast in sand and faced up in the lathe, and the whole clock bears the mark of a skilled hand.

It was dismantled by first disconnecting the little door which closes behind the cuckoo. Next, the hands were taken off and the back removed. This carries the wire gong on which the hours are struck. The bellows of the cuckoo pipes are worked by wires, the ends of which are bent into eyes which link with the lifting lever.

After removing the pendulum these levers were unhooked and the pipes removed by taking out the single woodscrew which holds each of them. They are neatly fitted and the shape is such that they cannot be reassembled in the wrong place, but care must be taken when refitting to see that the wire on one is under the cuckoo's tail, or the door will be held open.

Clock Details

Clocks of this type have the going train entirely to one side of the plates and the striking train to the other, and, in order to get the hands into the centre of the movement, they have a separate spindle. This has a taper pin to hold it behind the backplate, and at the front a tightly fitting brass wheel which carries two pins set opposite each other; the wheel will later be referred to as (*A*). The shaft is squared for the minute hand and threaded for a nut to keep the hand in position. The first spindle of the going train projects through the plate to carry a wheel and pinion. This is driven by friction against a pin and washer by the pressure of a spring, the wheel



The restored clock

meshing with the minute wheel (*A*) ; the pinion meshing with the hour wheel and through these four wheels a reduction of twelve to one is obtained. Adjustment of the hands is made by turning them against the pressure of the spring mentioned above.

These wheels and spindle carrying (*A*) may be seen in Fig. 2.

A Puzzle

Straightforward as the going train is, the striking one presented something of a puzzle. There are a number of wire levers and these are fixed by riveting them into taper broached holes in their shafts. Sometime in the past, one of these had become loose and to secure it a " repair " had been made by soldering it with a corrosive flux without taking it to pieces. Wherever flux had spattered, rust or verdigris had followed, in itself enough to stop the clock in time, but this obviously had not ended the slaughter. The wire had been bent into the correct position with sharp-edged pliers or nippers, which had notched it. This had led to a complete break with loss of the piece, in all, an awful example of what not to do. These wires look very casual, but they perform a series of exact motions and in the books open to me, it proved surprisingly difficult to find anything which gave any help to form an idea of the original, and, indeed, quite a lot of thought was necessary before I could guess at its possible shape. The case was further complicated by the lifting wire (*B*) being out of position by about 90 deg.

Referring to Fig. 3, and starting from the spring barrel (1) the first wheel (2) has seven pins and it

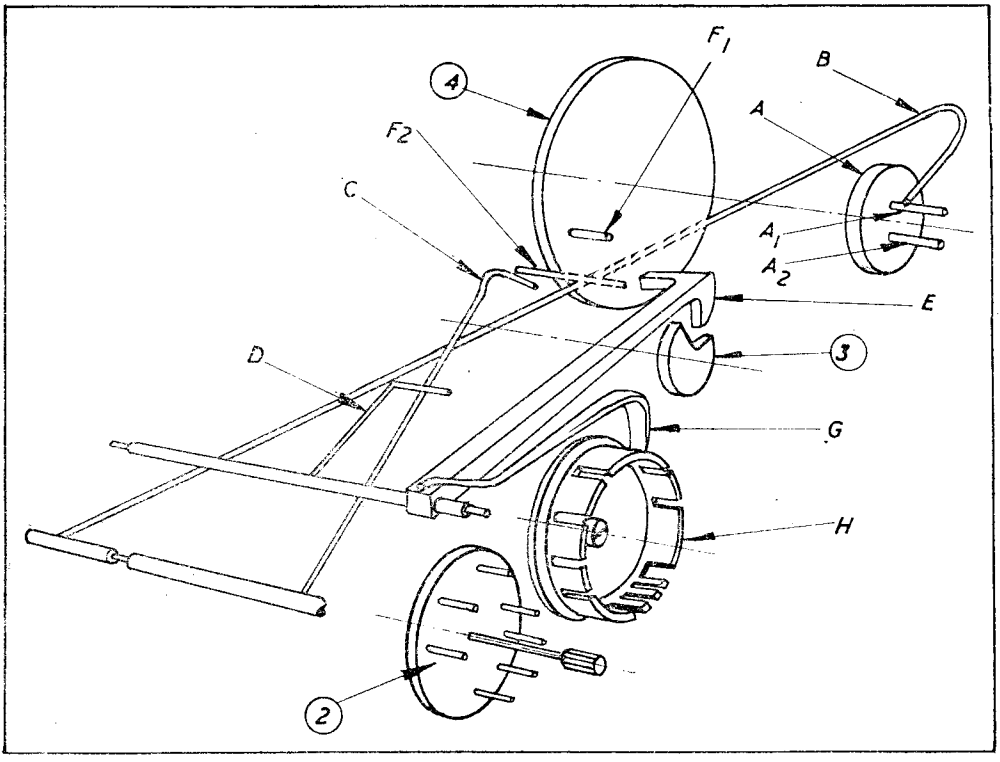


Fig. 1. Diagrammatic view of the striking train set to strike after warning

is these which lift the levers of the bellows and gong hammer. Passing to the second wheel (3) we find a cam fixed to the same shaft. The third wheel (4) has two pins, one on each side, set about a quarter turn from each other and, finally, the fourth wheel (5) is a pinion on whose

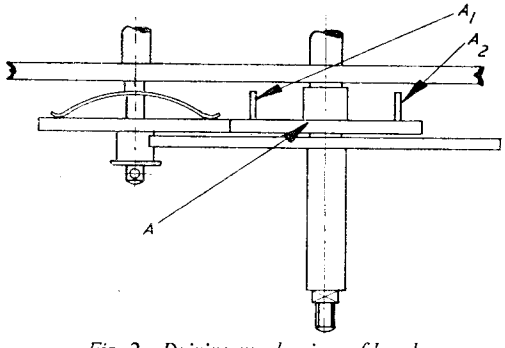


Fig. 2. Driving mechanism of hands

shaft is fixed the fan or fly which steadies the train and gives a reasonable interval between pipe notes and gong.

This train is tripped at each half hour by the pins, $A1$ and $A2$, on the back of the minute wheel A. Fig. 1 shows diagrammatically the arrangements of these wires and the count wheel which, in practice, meshes with the seven leaved pinion on shaft (2).

Consider the action when striking twelve. As the minute hand approaches the hour, pin $A1$ lifts the wire G, which through C and D lifts E out of the dip in the cam on (3) and at the same time out of contact with pin $F1$. This allows the wheel (4) to make a partial turn to come to a stop against C which in rising is brought into the path of $F2$. On the same shaft as E is fixed a wire G which is lifted out of the slot in the count wheel when E is raised. The partial turn of wheel (4) causes the warning noise through rotation of the fly. As the minute hand reaches the hour, B drops off A_1 and C then falls out of the way of $F2$, which allows the train to run. The cam on (3) revolves once for each blow of the gong hammer and at each revolution E tries to drop into the dip in the cam but is prevented by G, which drops onto the count wheel drum. The train continues to run, the tail G dropping into the count wheel for each stroke until the twelfth is reached when a slot is presented to G, into which it drops, allowing E to drop into the cam and into the path of $F1$, which stops the train.

The count wheel is pivoted on a shouldered screw which is fixed into the back plate and is driven by a seven leaved pinion on shaft (2). The count wheel drum is divided in the following

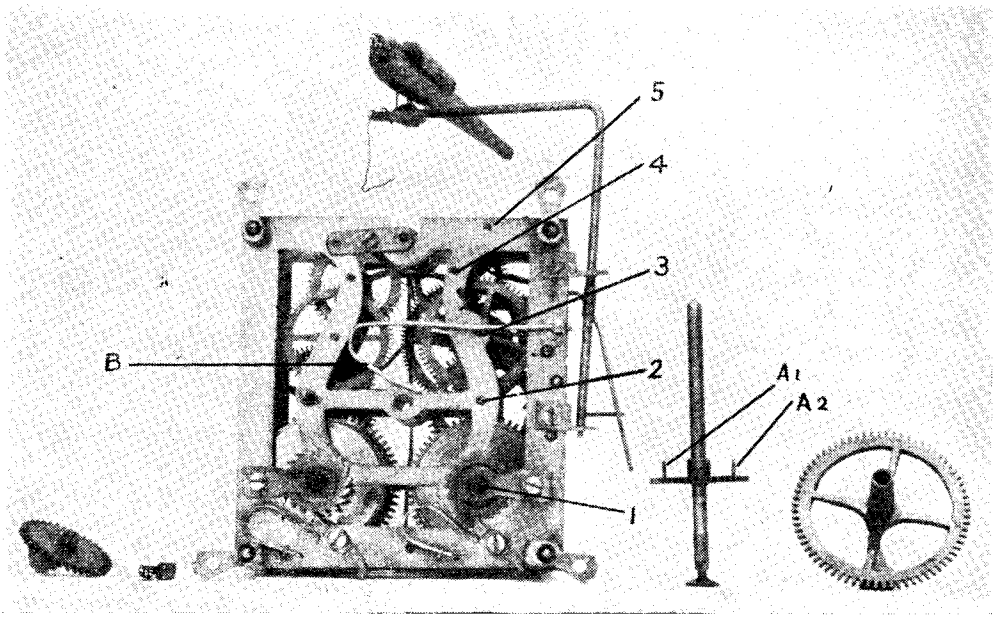


Fig. 3. The cuckoo clock partly dismantled

manner. There are 90 teeth in the wheel and each slot except the first after twelve, embraces two tooth spaces. On finishing the last stroke of twelve the tail *G* drops into a slot four spaces wide. At twelve-thirty the train is tripped by *A*2, and the clock makes a single stroke while the count wheel moves through one tooth space and the train comes to rest as the tail *G* descends into the second tooth space of the slot. At one o'clock and at one-thirty, this single stroke is repeated as the count wheel moves round to present the third and fourth tooth spaces of the slot. At two the first stroke is made and this time the tail *G* finds the side of the drum in its path, as it descends, and a further stoke is made which brings a space into line with the tail and it is into this that it drops, stopping the train. It will be seen that each hour from two to twelve has a plain portion of the drum, equal in width to the number of tooth spaces less one of the hour struck, i.e. the hour six has five spaces and twelve has eleven.

Not so Simple

This tail *G* had been lost and although once the action has been followed through it may seem a simple matter to replace it ; when I first came to do so, it seemed by no means simple.

The pins, *A*1 and *A*2, obviously had to have some particular relationship to *B* and to the minute hand also. This relative position can be adjustable within very small limits by bringing the tail of *B* nearer to or farther from its pivot. Also, *B* must be so shaped that *E* will be lifted out of the dip in the cam and at the same time *C*

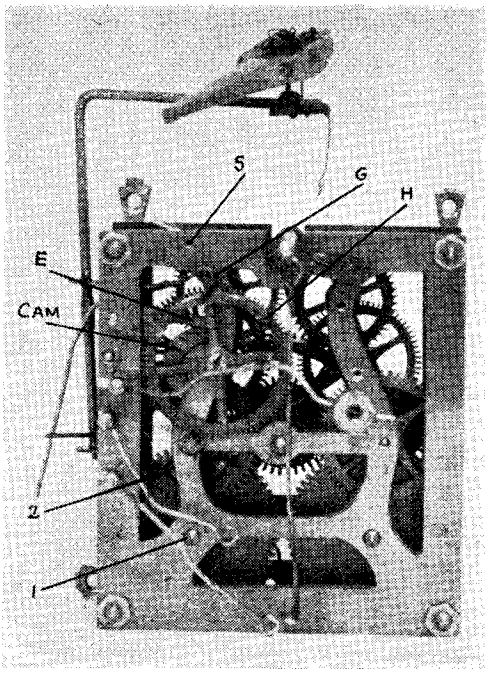


Fig. 4. View showing the works

must be brought into the path of *F2*. Further, the tail of *G* must be of such a length that when it drops onto the count wheel drum, it holds *E* out of the cam. The count wheel must be so positioned that when *E* is in the cam and the train is locked, the tail *G* is just able to clear the back face of the slot and to drop down, too. This can be done by setting the count wheel into mesh with the seven leaved pinion while the tail *G* is down. Slight adjustment can be made by bending *G* in the appropriate direction. Finally, (2) must be set so that when the train is stopped, the bellows and gong levers have just dropped clear of the pins on the side of the wheel. This being understood, the motion was dismantled by letting down the springs and unpinning the ratchet wheels and removing them; cuckoo removed bodily, pins withdrawn from the hand-setting wheel and minute hand spindle withdrawn. The plates were separated after removing the seven toothed pinion and the whole given a bath of petrol, followed by the usual routine of polishing powders to clean off the corrosion and restore the clock to working condition.

The plates were reassembled with only wheels 2, 3 and 4 in position and the shaft-carrying levers, *B*, *C*, *D* and *E*. The minute wheel spindle was also put through the plates and turned by hand, and wire *B* bent until it gave the right lift to cock and unlock pins *F1* and *F2* in turn. A piece of soft wire was bent up to give a satisfactory working shape for *G*, fitted temporarily and adjusted until it held lever *E* above the cam when resting on the count wheel. From this pattern the permanent lever was made in silver-steel and riveted securely in the shaft. Once more assembling the final adjustments were made, removed again and polished, and everything was ready for final assembly.

A New Lease of Life

Both trains were fitted with the various levers and the wheels placed in their correct positions relative to each other as mentioned above and, in due time, the clock was ticking again, and vigorously, too, without the pendulum. Wax polish on the case lifted it out of its drab and neglected condition, and once the bits and pieces had been put back into place a very charming clock began a new lease of life.

Since restoration it has been keeping time to about two minutes a day for almost two years, not very accurately perhaps, but to blend the old with the new, it becomes a simple matter each night when winding to correct it to the radio, and now it sits on its little bracket—a pleasant reminder of the days when a craftsman was able and proud to leave the prints of his own skill and artistry for posterity to admire.

"TRICKY" TURNING

by "Scotia"

IT occasionally happens that something has to be turned on the lathe which, for one reason or another, cannot be held in the chuck by the really firm grip we should like. This may be due to discretion exercised in protecting a finished bore from being squeezed, or it may arise through the inability to have the work properly supported by the back centre.

In any case, it is permissible to take only very light cuts ("picking at it," as we would say in engineering circles).

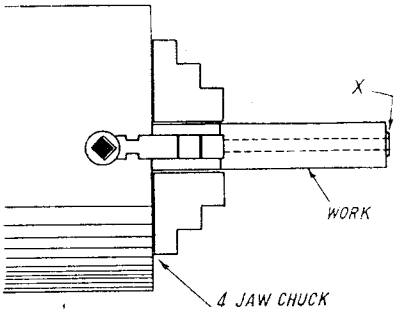
In such circumstances, there is a tendency, if one is not careful, for the work to come out of the chuck, or at least to move out of truth.

It is not easy to lay hard and fast rules in doing work of this nature, and one must keep constant vigilance as the work proceeds.

I find it an advantage, when ready to start work of this kind, to take a little cut carefully down the face, leaving a little step. The work is now proceeded with carefully, usually in a series of diameter cuts, all the while a watchful eye is kept on the little step turned first of all, as this gives an indication right away should the work move out of truth.

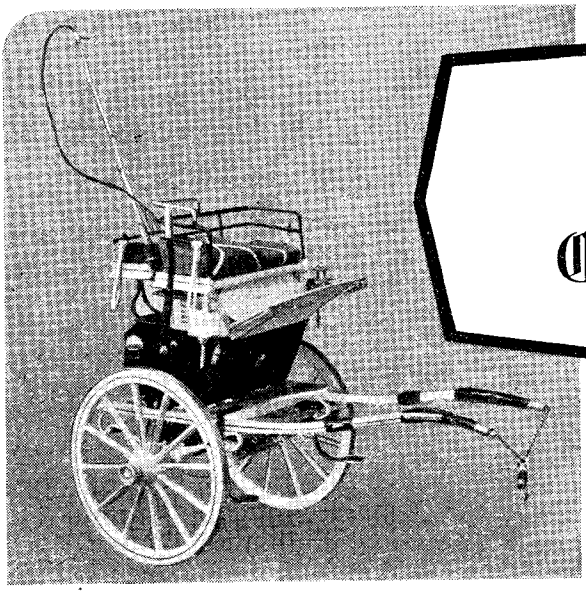
Care must be taken to see that the little tell-tale cut does not extend into the part of the work which should not be turned, but rather just short of it. Sometimes, too, when thin flanges of an irregular shape have to be faced, the grip is again of a precarious nature. Provided that one works with the correct tool, and at the proper speed, there is little need for concern.

An indication that the work may be shifting in the chuck is sometimes given by the sound



Sketch, showing square material with finished bore set up true as a secondary operation. The step or spigot "X" is the initial cut made for observation purposes

emitted taking on a different note, and such a warning should not be ignored. It is strange that in lathe work little warnings like this are given, provided one is observant enough to notice them.



N Model Coaching Cart

by

Peter Minton

THIS type of cart was used for transporting fighting cocks in the "good old days," and was sometimes called a "Cocking" cart; two horses were employed, in tandem.

The construction starts with framing up sides of body, and these are fixed on to a frame called "bottom sides." The bottom rear part of body has a door at the back hinged to fold down with a lock at the top. The sides of the front have a $\frac{1}{16}$ in. panel glued on. The bottom line of body measures 3 in., and the width $4\frac{1}{8}$ in.—squared up. The seat can then be made, fixed with rail all round which can be made from wire, soldered at joints; the seat is $4\frac{3}{4}$ in. $\times$ $1\frac{3}{4}$ in. The stays can then be made for rear seat which is $2\frac{1}{4}$ in long $\times$ $1\frac{1}{2}$ in wide with rail made of wire. Care has to be taken that the rear stay, where fixed, does not foul the door when opening. The drawing gives a good idea of the shape of stays.

The foot-board can be made and fixed, sizes and shape can be obtained from the drawing. The ventilation openings under front seat are carved out of a solid piece, which is let into frame. Next job is to get the shafts framed up $4\frac{1}{2}$ in. between curve as shown on drawing. Two springs can now be made with an overall length of $4\frac{5}{8}$ in. The front scroll is $\frac{5}{8}$ in. by $\frac{1}{16}$ in.; rear scroll $\frac{3}{4}$ in. by $\frac{1}{16}$ in.; centre of axle is $1\frac{1}{4}$ in. from front of body.

The shafts are framed up with cross rail at back end of shafts; one board on top of shafts at front is $1\frac{1}{2}$ in. wide. The width over rear bar of front is 5 in.; centre of axle from $1\frac{1}{2}$ in. board is $2\frac{7}{8}$ in. The scrolls are fixed on centre of shafts, which gives the size to bore the hole in axle for springs.

As will be seen, the body can be moved back and forward for balance by a lever.

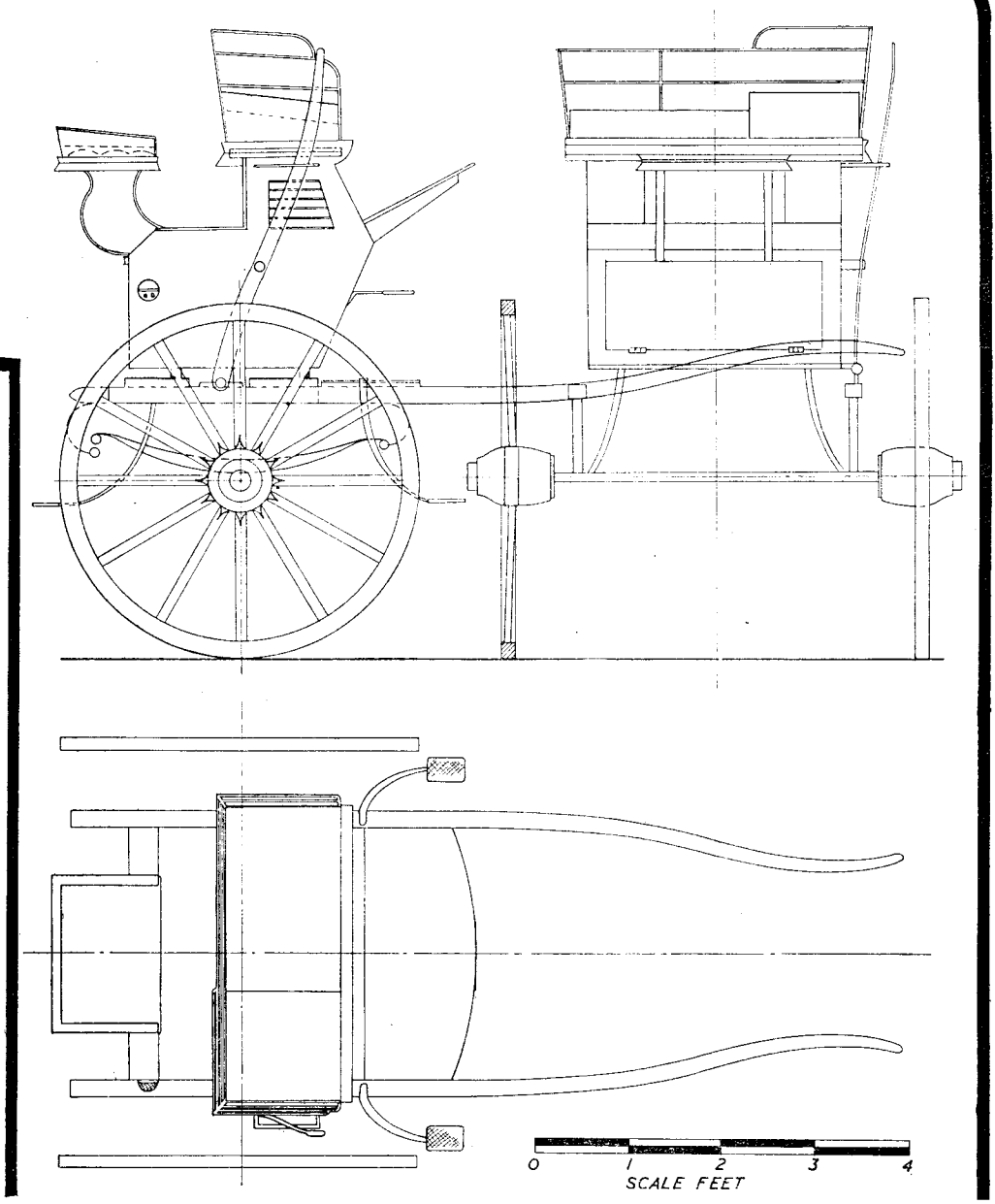
The movement of body top at handle is a ratchet plate just like on an ordinary carriage. On body are fixed two pieces of mild-steel with eyes on end, and the $\frac{1}{16}$ in. wire on shafts go through these eyes, then the lever moves the body. The wheels, which some modellers find very difficult to construct, are quite a nice part to make. Instead of making the pin end on spoke, I insert a dowel which is much stronger; all other parts of wheel are made as they used to be.

There is quite a lot of detail in these carts, such as :—stops on shafts, leather tips, cushions, lamps, chain from axle to drawbar, socket steps cut out on end of shafts, mats, etc.

Lamps are quite a nice job to make. Get a piece of brass $\frac{1}{16}$ in. thick; bend to what size you want, U-shape; fill in back part, solder from inside and clean up. Find the centre for stalk part, bore hole and insert a $\frac{3}{16}$ in. screw into bottom part of lamp, then you have the stalk that goes into lamp holder on body. Through this hole bore a hole in top $\frac{1}{16}$ in. dia., then another $\frac{1}{16}$ in. hole for rear red light. Through the $\frac{1}{16}$ in. hole on top of lamp, pass a 10-B.A. bolt through countersunk bolt head, get a small round part to act as a funnel on top of that, then a round brass button on top of funnel. Bolt the three together, then you have a lamp.

For glass, get a piece of Perspex, fit into lamp (solid), leave out Perspex beyond the $\frac{1}{16}$ in. brass on side, this is then bevelled to look like the real glass. To keep this Perspex in position on the end of your stalk leave it $\frac{1}{8}$ in. longer to go into Perspex. Make a small hole in Perspex at the back for red paint rear light. To finish lamp, put a piece of silver paper inside before you put in Perspex. You can also bore a $\frac{1}{16}$ in. hole in Perspex where stalk is screwed on, and it will look like a candle.

Should any reader require further particulars, I shall be very pleased to help them.



Elevations and plan of the model coaching cart

[Mr. M. B. Mervis, of Chicago, the celebrated collector of miniature carved horses and horse-drawn vehicles, referring to Mr. Winton as a "genius in his line," comments on his models' life-likeness, and adds: "In my 30 years of research and collecting, I have never found any artist or mechanic who was so capable of expressing himself and who displays as much care and pride in his efforts as Mr. Winton."

Mr. Winton, who is now 79 years old, exhibited another of his models at the recent "M.E." Exhibition—this time a model of a lady's Paris chaise, a picture of which is shown on another page of this issue.—Ed., "M.E."]

An Improved "Duplex" Hacksaw Machine

by E. M. Thomas

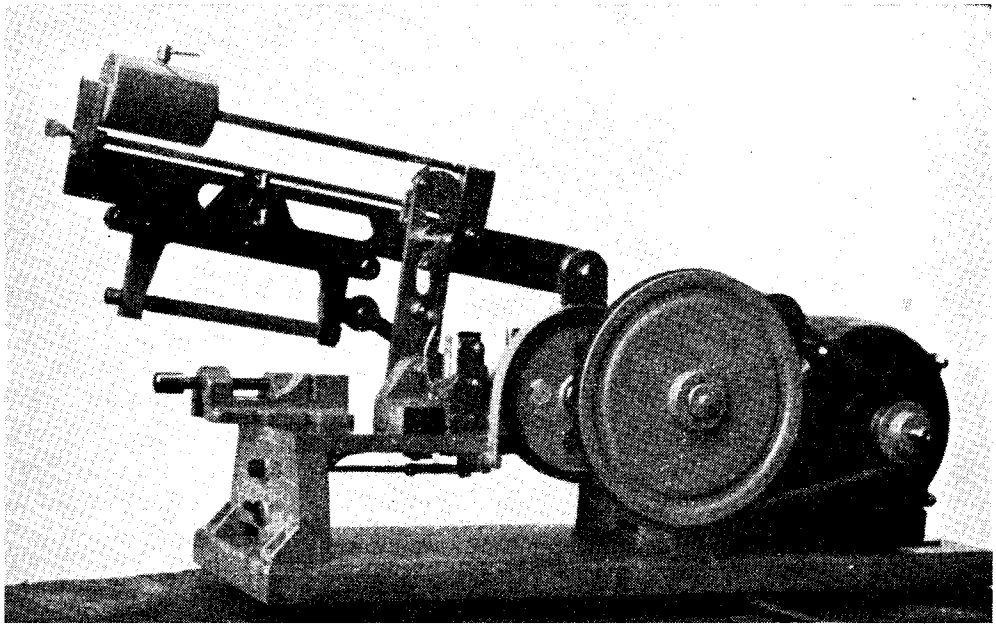
NO doubt many readers of THE MODEL ENGINEER have enjoyed building the "Duplex" hacksaw. This little machine saves much laborious work and also material, for it will cut squarely through stock, close up to a scribed line, thus saving subsequent trimming.

I was never quite satisfied with my machine; partly on the grounds of its lack of smoothness, and partly because of its slow rate of cut. It was felt that this machine would be much improved by the addition of a set of "monkey-glands," and results have amply justified this view. The machine, as reconstructed, cuts about 50 per cent. faster than before. It is now a stiffer and more rigid structure, and the reciprocating masses are counter-balanced. It will run dead smoothly under full load, the only noise being a slight whine emanating from the teeth of the fabroil pinion and Myford gear wheel.

As the modifications are quite simple and may amuse some readers of THE MODEL ENGINEER, sketches of the necessary parts together with a few comments are appended. All parts are quite easily made up from commercial stock sections.

After stripping down the machine, the first item to be tackled was the crank. The mass of the carriage with its associated parts, even though it only reciprocates at about 90 strokes per min., produced quite appreciable out-of-balance forces, and some counter-balance is desirable. A new crank was, therefore, designed and made from a piece of $\frac{1}{2}$-in. mild-steel that happened to be available.

The piece was trimmed and marked out. It was then clamped to a faceplate and both holes bored. The redundant pieces were then cut away, and the part polished. The crank is locked to its shaft by a taper pin, fitted as sketched, which is the position of maximum resistance to sheer.

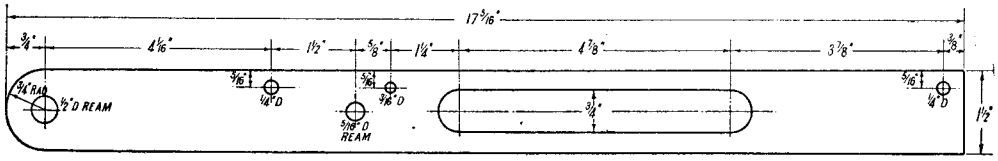


View of complete machine, showing the curved slot in the beam guide arm

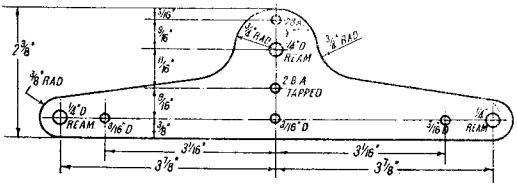
The next item to be made was a new big-end cap. This is of the fully-enclosed type, intended to keep the grease in and the dirt out.

After this, a new beam guide-arm was made. The only differences between this and the original are that the slot for the guide-arm shaft is curved instead of being straight, and this allows the width of the slot to be reduced to $\frac{7}{16}$ in. As the guide-arm shaft moves on a radius of $5\frac{9}{16}$ in., the centre-line of the slot is struck on this radius. In practice, it is very little more difficult to file a curved slot than a straight one.

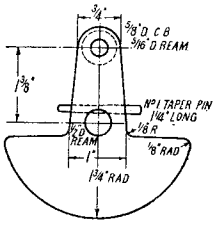
A new beam was now made. This is $1\frac{3}{4}$ in. longer than the previous one, and it will be noticed from the sketch that the slot is shorter and positioned differently to that in the original beam. In forming this slot, it is important to ensure



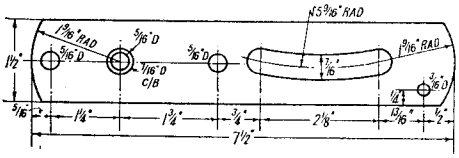
Beam



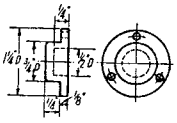
Carriage side members, $\frac{3}{16}$ in. thick mild-steel, 2 off



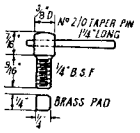
Crank web, $\frac{1}{2}$ in. thick mild-steel, 1 off



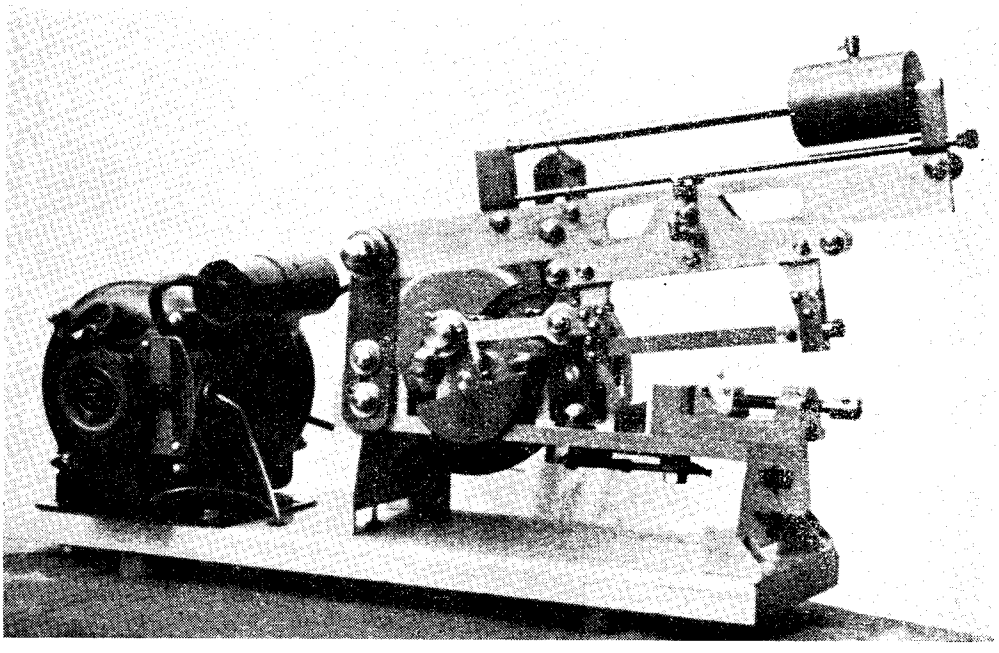
Beam guide arm, $\frac{1}{2}$ in. thick, mild-steel, 1 off



Big-end bearing cap, 1 off



Weight locking-bolt, steel 1 off



The completed hacksaw, showing balanced crank, extended beam, and long wheelbase carriage with angle lubricators

that it really is parallel with the underside of the beam.

The carriage is made from two pieces of $\frac{3}{16}$ in. thick mild-steel. The original ball-bearings were used again as runners, but their positions are re-arranged. Only one ball-bearing runs in the slot, while two now run below the beam. The idea is that the upper bearing takes the load while running light, whereas the two lower bearings take the load when cutting. The "wheelbase" of the carriage is $7\frac{1}{2}$ in., so giving it far greater stability than the original arrangement. Further, it should be noted that the thrust of the lower bearings is, for the most part, taken by the unslotted part of the beam. The structure is consequently more rigid.

In making up the carriage, the holes for the lower bearings were finished first, the two pieces having been clamped together. One piece was then taken, and the two lower ball-bearings clamped in position with $\frac{1}{4}$-in. bolts. The beam was then offered to this carriage-piece, with its lower edge butting tight against the bearings. The third bearing was placed in the beam slot, the assembly correctly positioned and then clamped. The top ball-bearing was then used as a jig for locating the position of the hole in the carriage-piece for the upper ball-bearing bolt. The two carriage-pieces were then re-assembled together, and the hole continued into the other piece of the carriage.

The old saw frame was used, and it is bolted to the carriage by three $\frac{3}{16}$-in. bolts. Two 2-B.A. holes were tapped in each carriage-piece to accommodate four small spring-lid lubricators. These are of the angle type; and, as may be seen in the photograph, they are both neat and accessible.

As the new beam is $1\frac{3}{4}$ in. longer than the old one, a new weight shaft and control-rod were made up from silver-steel to suit.

To complete the hacksaw, a more handy type of weight locking-bolt was substituted for the Allen grub-screw originally specified. This does away with the need for keeping an Allen key near the machine.

Finally, I would like to express my appreciation of all the material that "Duplex" have given us. Their tools all work well, and the finish of their exhibited products is of a very high order. My re-construction of the hacksaw should in no way be construed as criticism, the spirit of the operation was more that of trying to "paint the lily"!

INDUSTRIAL BARRIER CREAMS

MOST people are familiar with the name Innoxa in connection with toilet preparations and cosmetics, but the application of the class of products bearing this name to the engineering industry is by no means so well known. For some years now, however, the Innoxa laboratories have been conducting research into a problem which has long worried many industries, including engineering, namely, the protection of the human skin against the effects, mechanical, chemical or otherwise, of substances which have to be handled in the course of daily work. As a result, a series of "barrier creams" have been developed, which not only facilitate cleanliness and avoid the need for harsh scrubbing of the skin, but also furnish a protection against dermatitis, acid burns, dye stains and the like. Some time ago, a very practical demonstration of the efficacy of these preparations was given, at which this journal was represented.

The barrier creams are produced in various forms to suit special industrial requirements, comprising two main groups; the first being water-soluble and used when handling dry, oily, greasy or grimy but normally water-free substances, and the second being water-repellant, giving protection against acids, alkalis and chemicals containing water.

In the course of the demonstrations, a water-soluble cream (BD7) was first applied to the hands and thoroughly rubbed into all interstices, after which powdered graphite was rubbed in and rough materials handled to simulate working conditions. Despite the grimy state of the hands after this treatment, they were completely cleaned in 30 seconds, using tepid water without recourse to cleansers or abrasives. The same cream was again employed, and engine sump oil, rendered fluorescent by the addition of anthracine, was washed into the hands. On immersing the hands in warm water, the barrier cream expanded, forcing the oil away from the skin, and after rinsing and drying, a test with ultra-violet light showed that all traces of the activated oil had been completely eliminated. In a further test, cellulose paint was used, and was found to be just as easily and completely removed by simple washing in water.

The tests of water-repellent creams gave still more convincing results. Using barrier cream BW2, it was found that active acids and other reagents could be handled with impunity, including hydrochloric acid in which pieces of zinc were rapidly disintegrated. Washing the hands in a strong detergent, and drying, did not remove the cream; further immersion in the acid proved that it was still as effective as before, and it is stated to remain so for about four hours at a single application.

In addition to protection of the hands from outside contamination or injury, the barrier creams work equally well "in reverse," by protecting goods from being soiled or contaminated by the workers' hands. This applies effectively to the packaging of certain foods, handling instrument parts, and very much reduces the risk of causing rust in handling tools or other steel objects.

Information and advisory service on the full range of these barrier creams and their appropriate uses can be obtained from Innoxa Laboratories, 1, Eden Street, London, N.W.3.

AN ADJUSTABLE RULE STAND

THE rule stand illustrated was made by a friend while serving his apprenticeship with a famous engineering firm.

As the stand is so well designed for its purpose and would also be interesting to make, it will, no doubt, appeal to those readers who take an interest in adding useful and ingenious tools to their workshop equipment.

The appliance is primarily intended to stand on the surface plate, and the rule, when held in the clamp, can then be set either in contact with the surface plate or it can be raised, by means of the fine-adjustment screw, to any required height.

A further application would be to employ the stand as a comparator by attaching a dial test indicator to the rule holder.

In this way, a batch of parts could readily be checked for size by standing the items, one at a time, on the table of the instrument and noting the

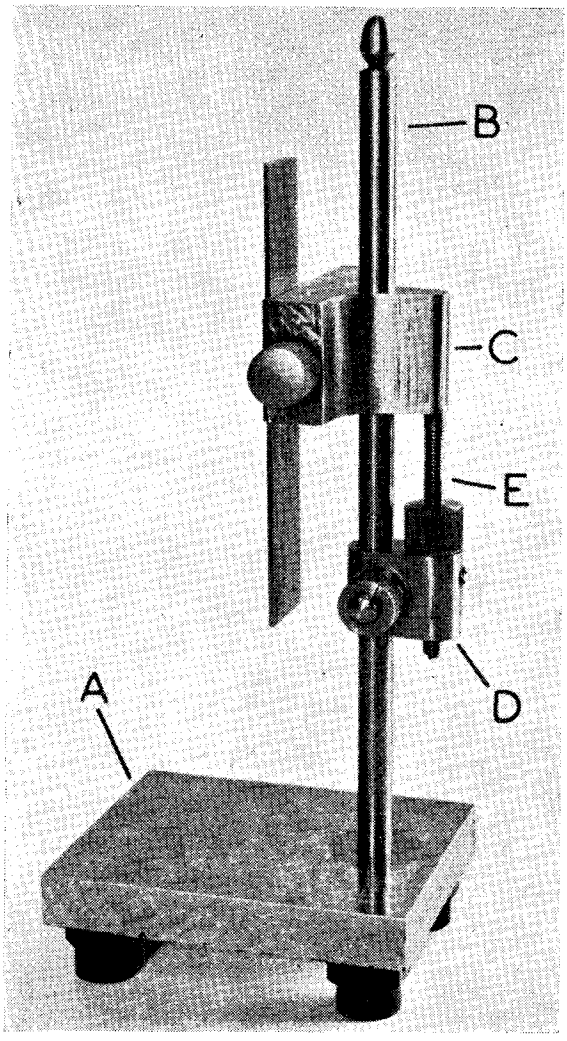


Fig. 1. *The finished rule stand.* "*A*"—*the table base* ; "*B*"—*the pillar* ; "*C*"—*the rule clamp* ; "*D*"—*the fine-adjustment bracket* ; "*E*"—*the adjusting-screw*

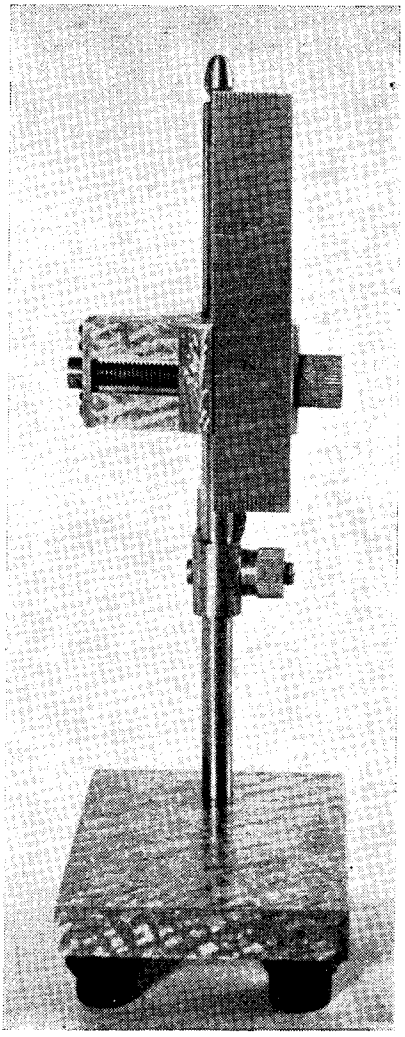


Fig. 2. *Showing the rule clip and screw*

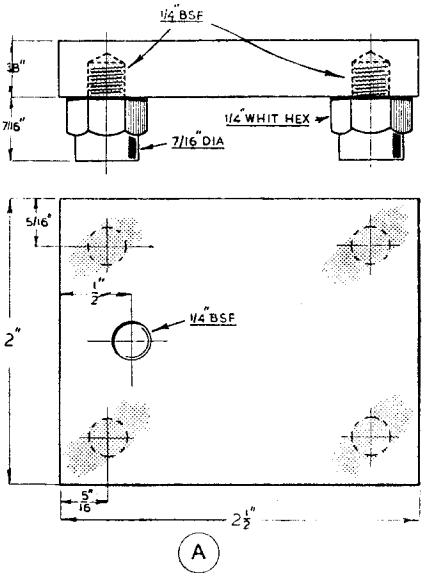


Fig. 3. The base with its supporting feet

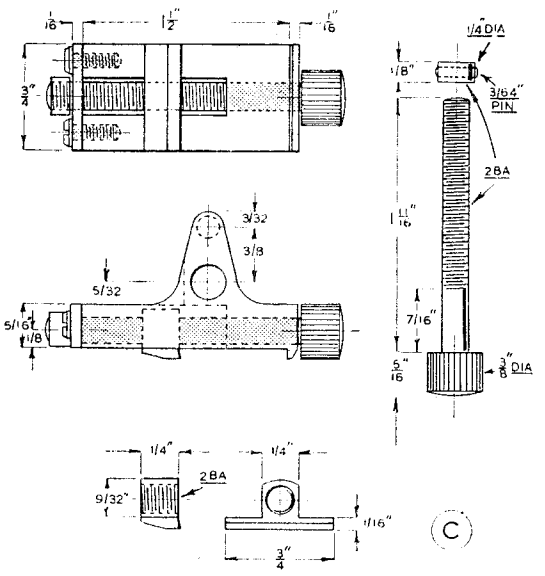


Fig. 4. Details of the rule clamp

reading of the test indicator. When using the appliance in this way, it would be an advantage to fit the rule holder with a set-screw, so that it could be securely clamped to the pillar to avoid any inadvertent alteration of the height setting.

Making the Rule Stand

A start can be made with the base table (*A*) and, although a short length of mild-steel, $\frac{3}{8}$ in. in thickness will serve quite well, an iron casting will have better wearing qualities. After the table has been filed true and square and the upper surface scraped flat, the four feet can be fitted. These feet are turned from hexagonal rod gripped in the self-centring chuck, and time will eventually be saved if care is taken to machine the foot portions to exactly the same length. After the hole to receive the pillar (*B*) has been drilled and tapped, the table, with its feet in place, is transferred to the surface plate and the test indicator, mounted on the pillar of the surface gauge, is next brought to bear on all four corners of the table in turn.

If the readings taken are not identical or if the table rocks on the surface plate, the contact surfaces of the feet must be scraped until an even bearing is obtained and the upper surface of the table lies level.

It will be seen that in the original design the $\frac{1}{4}$ in. dia. pillar is threaded $\frac{1}{4}$ in. B.S.F. and screwed into the table; this means that the threads themselves form the register surface, and any errors of tapping or dieing will set the pillar out of vertical. To ensure accuracy in this respect, it might be better to shoulder the lower end of the pillar and thread it 2 B.A.; the pillar would then fit into a clearing-size hole in the

(*Continued on page* 619)

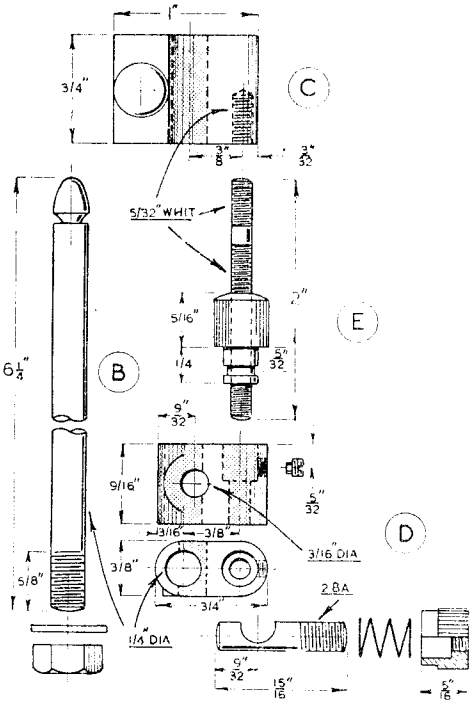


Fig. 5. "B"—the pillar; "C"—the rule clamp; "D"—the fine-adjustment bracket; "E"—the adjusting-screw

Rebuilding Model Stationary Steam Engines

by B.C.J.

IT cannot perhaps be claimed that there are a great number of men whose model engineering interest is that of the stationary engine—certainly they are not to be compared in numbers with those whose interest lies in the locomotive or with those who spend much time at the pond side persuading a small speed boat to do a job of work.

Yet there *are* stationary engine enthusiasts—and these people must surely have a little encouragement from time to time! For although the stationary steam engine on a grand scale is fast becoming a thing of the past, it would be a pity to permit its small counterpart to perish—certainly not while there is a model engineer of ability and a workshop available.

Now there are quite a number of model engineering enthusiasts with workshops adequately equipped to build a stationary engine from castings—or to make patterns if that were necessary. There are, however, be it remembered, complete engines to be purchased through the advertisement columns of THE MODEL ENGINEER—some may be good, others not so good; but all present a problem of some interest for rejuvenation.

In any case, in the second-hand engine one must not expect the perfection of a new engine—there will be worn parts, damaged parts, and even missing parts, but there should be nothing beyond the skill of the average man to put in order. The renovating process, indeed, provides an interesting occupation and it provides for ingenuity and imagination.

The small steam engine incapable of minor improvement or alteration is liable to lose interest rather quickly—and as a stationary engine, to become a little *too* stationary.

If the new purchase is not already provided with a governor, then by all means fit one of these attractive little gadgets. Let it be operative if this is at all possible—otherwise a dummy governor with balls to be thrown out by centrifugal force is permissible. Personally, I have grave doubts as to whether very small governors can be made to *govern*—do they not merely *hunt*?

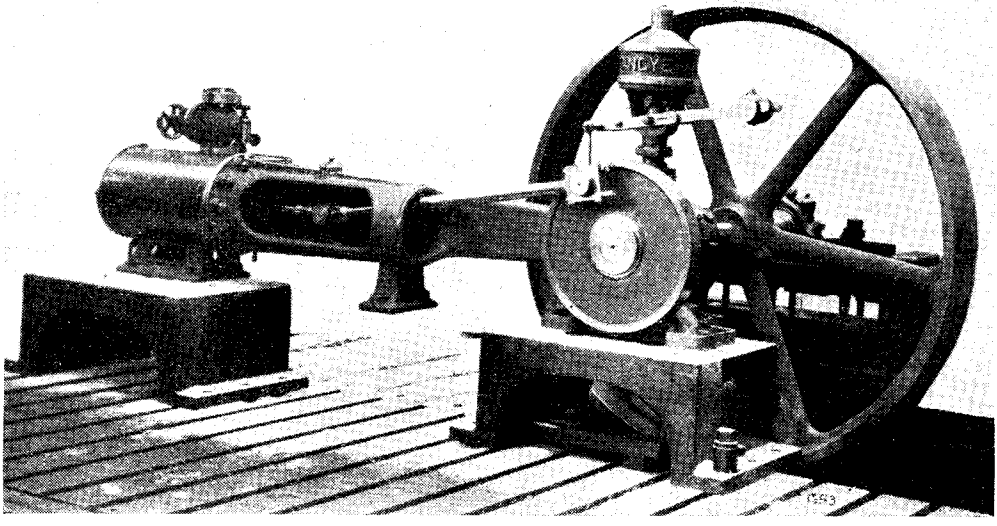


Fig. 1. A typical Tangye engine of the last century. (Reproduced by kind permission of Tangye Ltd.)

Small engines can be fitted, in suitable position, with dummy sight-feed lubricators; these little fittings, when about half-filled with oil, have a very attractive appearance. If you think you can make a *working* sample of an S.-F. lubricator—well, have a go. A displacement lubricator is pretty nearly essential with superheated steam, and not at all objectionable with steam of the ordinary kind.

Various other types of lubricator can be fitted with advantage here, there and everywhere—they are ornamental, rather useful and altogether attractive. Trunk guides need something pretty efficient, however—to stop that knock.

Drain cocks are advantageous for the cylinder

and those for the front end and back end should be coupled together with a neat looped rod. A *dummy* revolution counter—of either cylindrical or box-form—is easily made and simple mechanism can be devised to oscillate the spindle. One more moving part is thus added to the engine.

Other things which add much to the realistic appearance of an engine are: Wood or metal lagging on the cylinder and valve chest, a curved crank guard, sundry small drip-trays to keep the engine free from water, a hard wood plinth to support the engine and give flywheel clearance, a fence (perhaps) to protect the flywheel, and, of course, the usual steam and exhaust pipes, pulleys, belts and whatever else occurs to you.

Typical Advertisements from THE MODEL ENGINEER

Horizontal Mill Engine. $3\frac{1}{2}$ in. × $2\frac{1}{2}$ in., coupled to 12 V car dynamo complete with pump and governor, double-web crank, 14 in. flywheel. Sound engineering job with vertical centre flue boiler, 40 tubes with superheater . . .

Sale. Model Steam Generating Set, horizontal engine, $1\frac{1}{4}$ in. × $1\frac{7}{8}$ in. stroke, fitted with water tank, governors, 5 in. flywheel, weight 13 lb. Solid fuel type boiler, pressure and water gauges. S.V. and injector valve, etc. . . .

Horizontal Steam Engine. $2\frac{1}{2}$ in. bore, 4 in. stroke. Eccentric pump, three-speed governor, heavy flywheel, $13\frac{1}{2}$ in. diam. Would pay for complete overhaul. Price £15 . . .

Horizontal Stationary Engine. $1\frac{1}{2}$ in. × $2\frac{5}{16}$ in. Stephenson link motion, eccentric feed pump. Heavy flywheel, good condition, £15 . . .

Horizontal Engine. Complete with horizontal gas-fired boiler, fitted with water gauge, feed pump, pressure gauge, £5.

Fig. 1 is from a photograph of the well-known Tangye long-stroke steam engine. It will be observed that there is a disc-crank and a trunk guide and a flywheel supported by bearings on both sides. No support for the outer end of the trunk guide is shown in the illustration, which, however, gives a good general idea of the steam engine as built fifty years ago perhaps.

Parts That Could Have Been Made Better

Fig. 2 shows a group of small engine parts all of which show evidence of bad workmanship or of unsatisfactory design. *A* is an eccentric-rod taken from a model engine and it will be seen that this is crowded with examples of poor workmanship. The hole for the pump plunger is drilled out of centre, the two flats hereabouts are not equally disposed, the thread at the strap end is a very poor specimen and, finally, the " dog's hind leg " kink does not seem to be really necessary. Surely the eccentric sheave and strap could have been shifted along the shaft so as to give a straight rod. This has now been done and a piece of silver-steel forms the rod and both ends of the rod have been satisfactorily dealt with.

Sketch *B* is a cylinder cover. Why has it but five holes in it? Pressure or no pressure six, ten or twelve holes would have improved the appearance. No model engineer should be afraid of using plenty of bolts and nuts in such places.

Sketch *C* shows a steam chest cover and here again the four bolt holes seem totally inadequate. Double the number would not have been extravagant. But in this case the designer appears to have been uncertain as to stud numbers, for four extra holes have been drilled *close to the first group*. The designer did little other than that of putting me to the trouble of plugging this particular set of holes (see dotted circles). Unwanted holes are a rather common failing of the amateur.

D is the end-on view of a connecting-rod cap—indicating how apparently easy it is to locate the holes *off-centre*. But how bad the appearance—and how difficult to set right. One would not have expected that there was any really difficult problem here (in marking-off and centre-punching). Miss-drilling such a part really spoils the whole job at the outset. Of course, the same remarks would apply to main-bearing caps and other similar parts.

E shows part of a piston-rod—the part that fits into the crosshead. The rod end is *reduced* in diameter. It might well have been *increased*. Moreover, the taper pin hole reduces the cross sectional area still further. There really is not much material left to carry the load, is there?

A crosshead is sketched at *F*. Its construction is a little unorthodox. The cavity in the centre near the gudgeon-pin is formed partly by drilling a large vertical hole and then by passing a hack-saw into this at two points. The final result was far from pleasing. However, with the aid of several small needle files and much expenditure of time I was eventually able to produce a very creditable cross-head and one which I think would not disgrace any engine—and some I expect it would actually improve!

I shall now briefly describe some steam engines, until recently at work in the vicinity, but now, alas! removed from their activities, all being perhaps a little typical of this class of machine.

Three of them found shelter in a tannery where presumably they became accustomed to the odour. Two were horizontal with overhung cylinders and the third was vertical. This latter was conspicuous for a very decided knock at the upper end of the stroke—it was indeed more of a " thump " than a knock. I could not be sure whether it was caused by water in the cylinder, or whether the changeover of the crosshead from one side of the trunk guide to the other was the cause. This engine stood about 8 ft. high from floor level and it would have presented a very pleasing appearance—if it had received a good clean up every 10 years—but, no, it just revelled and ran in dirt. I was sorry, nevertheless, when it was removed and replaced by conspicuously clean electrical apparatus.

The two horizontal engines also suffered removal, but I have no record of this sad event—they simply went!

There was in the vicinity one other engine—horizontal with a long stroke—probably 2 ft. It was located in an engine house close beside the River Severn and was put into use for pumping water from the Severn to a canal on

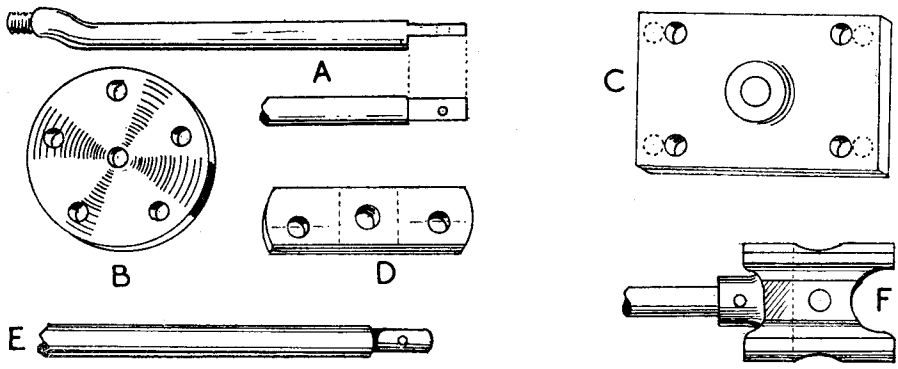


Fig. 2. Some engine parts that could have been made better

any occasion when a large water wheel (23 ft. diameter) was not for some reason available. In my experience the water wheel always *was* available, so that the steam engine was never put to use and when I last visited the district the poor old engine was no more, it had been sold for scrap—to be broken up, by the way, by the self-same people who originally built it—a sad ending.

Purchase of Second-hand Engines

And now a few remarks as to the advisability or otherwise of buying engines that are no longer new, and may be badly worn and delapidated. If you can see an engine before deciding to make a purchase, well and good—you can form some idea of its condition. I have myself bought *three* engines, however, without having had a sight of them! A dangerous step to take! I think that in no case was the engine worth the price paid, but always was there good material to work on—and that was about all I expected.

From my own experience I should judge the advertisement columns of THE MODEL ENGINEER a pretty safe field to explore for something of real interest in the steam engine line. If you can reach a more reliable market—by all means do so.

AN ADJUSTABLE RULE STAND

(*Continued from page* 616)

table, and the shoulder now forms an accurate register surface. It is also advisable to lap the pillar, so that the two sliding members will travel smoothly and accurately when adjustments are made.

The Rule Clamp (C), Fig. 4

This part is also made of mild-steel and is best cut out from the solid; but, to save unnecessary work, the fixed jaw of the rule clip can be made separately and then hard-soldered in place. The sliding jaw should have its gripping surface under-cut to give a firmer hold on the rule. The remaining parts are easily made and need no special description.

As previously mentioned a clamp-screw with a knurled head should be fitted to the body of the rule clamp when the appliance is to be used as a comparator in conjunction with the test indicator.

The Fine-adjustment Bracket (D), Fig. 5

Mild-steel is, again, used for this part, and it is locked to the pillar by means of the slotted draw-bolt shown in the working drawing.

A reliable method of machining the draw-bolt is as follows: the bracket is first cross-drilled to $\frac{3}{16}$ in. dia.; a short length of $\frac{3}{16}$ in. dia. rod, threaded at either end, is then inserted and secured in place by means of nuts on the ends; next, a reaming-size drill is put through and the hole is reamed $\frac{1}{4}$ in. dia. to take the pillar; finally, the draw-bolt is cut off to length and, at the same time, the unwanted threaded end is removed.

When marking-out the drilling centres on the bracket, it is, of course, important to keep the centre-lines at the correct distance apart in order to form the slot in the draw-bolt to the right depth.

The Adjusting-screw (E), Fig. 5

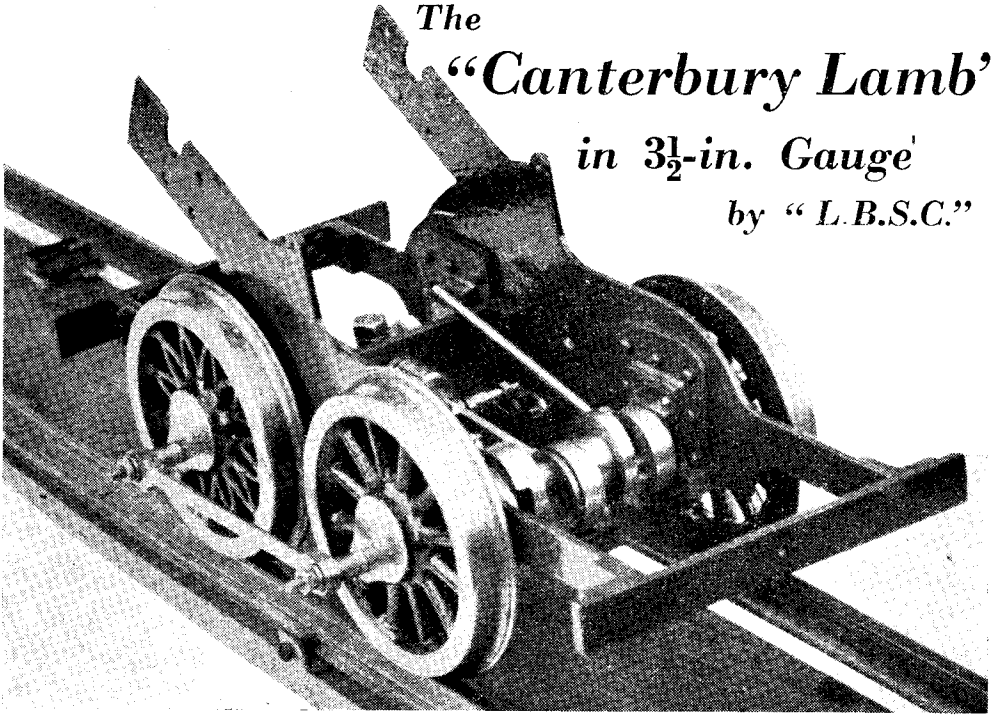
This part is shown threaded 5/32 in. Whitworth, but No. 3 B.A. will serve equally well.

In the original tool, a left-hand thread is used so as to lower the rule when, as seems natural, the finger-nut is turned in a clock-wise direction, but this is a refinement that can well be omitted. The kuurled finger-nut is a separate part and it is shouldered and grooved at its lower end to fit into the recess in the adjustment bracket, where it is retained in place by means of a small set-screw. At its upper end, the adjusting-screw is screwed securely into the body of the rule clamp.

Where the rule stand is to be used as a comparator, a small soleplate is made for gripping in the rule clip, and a spindle is then fixed in the plate to carry the test indicator.

The "Canterbury Lamb" in 3½-in. Gauge

by "L.B.S.C."



Mr. S. Reeves is getting on with it

WE now come to one "little bit of something that the big one hadn't got," viz., the mechanical lubricator for keeping the cylinders well oiled; incidentally, I hope none of the builders will emulate the cylinders—in another sense! To the best of my knowledge and belief, the full-sized job relied on a couple of crude tallow cups, which probably did all that was needed, as the steam itself provided a certain amount of lubrication. The cooling effect of the exposed outside steam pipes must have condensed a fair amount of steam, even before it reached the cylinders; and the condensate water helped to prevent the valves and pistons from seizing up. Incidentally, I have heard from several marine engineers, that lubrication of steamship cylinders and valves is cut to minimum, owing to the necessity of preventing oil getting into the exhaust steam condensers, and entering the boilers with the feedwater.

The lubricator I am specifying for *Invicta* is of my tried and tested "standard" pattern, except for a slight alteration in the manner of fixing the pump stand, and in the underneath check valve. As this type has been fully described several times, a brief run through the construction should enable anybody to make a successful job of the whole doings.

Oil Tank and Pump Stand

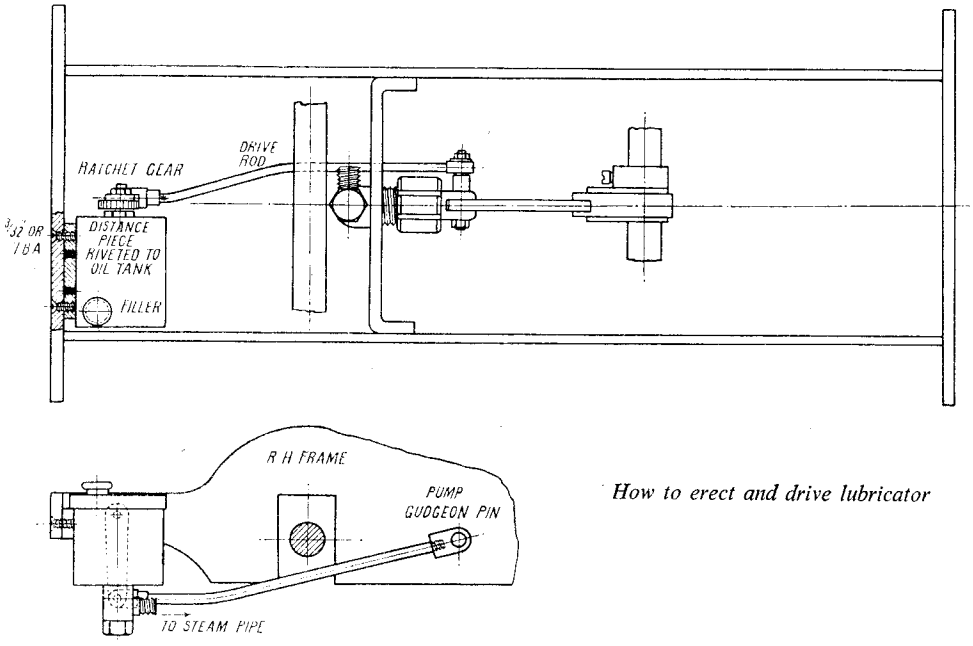
The oil tank is made from 20-gauge brass or steel. Cut a piece 4½ in. long and 1 in. wide, and bend it into a rectangle measuring 1¼ in. × 1 in., a job my Diacro shear and bending brake does as quickly as I can write the instructions. Stand it on a piece of similar metal measuring a full 1¼ in. × 1 in., and $\frac{1}{16}$ in. thick. If brass, silver-solder all around the joint, and the corner; if steel, it can be brazed, it's cheaper, ye ken. File the bottom edges flush with the sides, and smooth off the corner. At $\frac{3}{16}$ in. from the top, on the centre-line of one of the shorter sides, drill a $\frac{3}{16}$ in. hole. Drill a 7/32 in. hole right in the middle of the bottom plate. The longer side you are looking at, when the hole in the shorter side is to your left, will be the front of the tank; and a 1 in. length of $\frac{5}{16}$ in. × $\frac{1}{8}$ in. brass, is riveted and soldered to this, at $\frac{3}{16}$ in. from the top edge. This will take the screws holding the lubricator to the front beam.

The snap-on lid, with filler, may as well be made at the same time; simply cut out a piece of 20-gauge metal 1½ in. × 1¼ in. (full length each way) snipping a ⅛ in. square out of each corner. Bend this in the form of a tray, fitting it to the top of the tank; and when it just snaps on and off nicely, braze or silver-solder the corners, but do them on the Mc.Goldstein principle, or the lid won't go on after the job is done. Drill a ⅛-in. hole in one corner, and put a ring of ¼ in. tube in it, which may either be soft-soldered, or silver-soldered at the same time as the corners. Turn up a brass flanged plug for it, a nice push-in fit.

The pump stand is made from $\frac{5}{16}$ in. square brass rod. Chuck truly in four-jaw, face the end, turn down $\frac{3}{16}$ in. length to 7/32 in. diameter, and screw it 7/32 in. × 40. Centre the end, drill down

a full $\frac{5}{16}$ in. depth with No. 44 drill, and ream 3/32 in. If you haven't a 3/32 in. reamer, take a scrape out of the hole with a taper pin broach. Skim off any burr, and part off at 1 in. from the shoulder. A rebate $\frac{3}{8}$ in. long and $\frac{1}{16}$ in. deep is cut at the top of the stand ; and a recess, $\frac{1}{4}$ in. long

face off, centre, and drill No. 44 for $\frac{1}{4}$ in. depth. Turn down about $\frac{3}{16}$ in. of the outside to 7/32 in. diameter, and screw 7/32 in. × 40. Take the rod out of the chuck and hold it in the bench vice whilst you cross-slot it with a saw or thin file, to about $\frac{1}{16}$ in. depth ; replace in chuck, and part off



How to erect and drive lubricator

and $\frac{1}{16}$ in. deep, is made at $\frac{3}{16}$ in. from the bottom. These can be straight-milled, end-milled, or filed. On the centre-line of the same side, drill and tap a $\frac{3}{16}$ in. × 40 hole at $\frac{3}{16}$ in. from the top. At 9/32 in. from the bottom, drill a No. 41 hole, and be sure this one goes through dead square, or there will be leakage between pump cylinder and stand. Pin-drill the back of it to $\frac{1}{8}$ in. depth, using a $\frac{1}{4}$ in. pin-drill with 3/32-in. pilot.

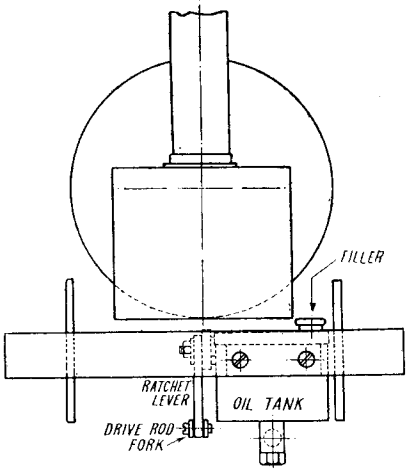
At 3/32 in. from the bottom, and at $\frac{1}{8}$ in. centres —that is, $\frac{1}{16}$ in. each side of the vertical centre line, drill two shallow holes with No. 55 drill. As soon as the right-hand one has fairly started, hold the brace a little to one side, and drill right into the hole which runs up the nipple. Drill the other in for about $\frac{1}{16}$ in., then chip a groove from it, to the bottom of the stand ; or it may be milled if you have the needful cutter. Rub the portface on a smooth flat file, laid on the bench, and finish by rubbing lightly on a piece of fine emery-cloth laid on the lathe bed, or anything else flat and true.

Pump Cylinder

The pump cylinder is made from a $\frac{1}{2}$-in. length of $\frac{5}{16}$-in. brass rod, both ends being squared off truly in the four-jaw. On the centre-line of one of the ends, and at $\frac{3}{16}$ in. from one of the facets, make a centre-pop. Chuck in four-jaw with this pop-mark running truly ; drill through with No. 44 drill, and ream 3/32 in. Open out to $\frac{3}{16}$ in. depth with $\frac{3}{16}$-in. drill, and tap 7/32 in. × 40. The headless gland is made from $\frac{1}{4}$-in. brass rod. Chuck, a $\frac{1}{8}$-in. slice. Screw this into the tapped hole in the cylinder, and poke a 3/32-in. parallel reamer through the lot by hand. If you haven't a regular 3/32-in. parallel reamer, you can improvise one in two wags of a dog's tail, by filing off the end of a piece of 3/32-in. round silver-steel at an angle—like the man in what the Hon. Algy calls the delicatessen, and Bert Smiff calls the cookshop, slices a German sausage—harden and temper to dark yellow, and rub the sliced end on an oilstone. Round off the cylinder as shown in plan sketch.

On the centre line of the sid efarthest away from the bore, drill the No. 55 port, and drill and tap the hole for the trunnion pin, as shown. The latter is a piece of 3/32-in. round steel, screwed at both ends, and must be screwed into the cylinder so that it is exactly at right-angles to the rubbing face. Otherwise, oil will escape between the contact faces of cylinder and stand, and the engine won't get any. Put the 3/32-in. reamer through again, in case the drilling and tapping have made any burrs or distortion, then turn up a wee brass plug for the bottom end, as shown in the section. This should be a tight squeeze fit, but may be soldered over as well, as an extra precaution. Leave the head as thin as possible, to avoid it rubbing on the bottom of the tank when the whole bag of tricks is erected. True up the contact face, same as the portface on the stand, before screwing in the trunnion pin permanently.

The pump ram or plunger is made from a piece of 3/32-in. rustless steel or bronze rod, screwed



Front view, showing how the lubricator is erected and offset

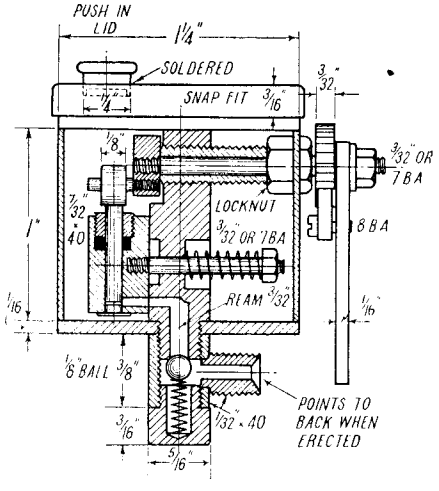
and silver-soldered into a bronze bush, a job needing no detailed instructions. The bush is merely a $\frac{1}{8}$-in. slice parted off a previously-drilled piece of $\frac{3}{16}$-in. rod, held in three-jaw. Pack the little gland with a few strands of graphited yarn. The trunnion spring is wound up from 22-gauge tinned steel wire (music or piano wire) and is secured by an ordinary commercial nut and washer.

centre of the shaft, giving the pump a full $\frac{3}{16}$ in. of stroke. To make the bearing, chuck a piece of $\frac{5}{16}$-in. hexagon brass rod in three-jaw; face, centre, and drill down about $\frac{7}{8}$ in. depth with No. 41 drill. Turn down 23/32 in. of the outside, to $\frac{3}{16}$ in. diameter, and screw $\frac{3}{16}$ in. × 40. Part off to leave a $\frac{1}{16}$ in. head; reverse in chuck, and chamfer the corners of the hexagon. Make a lock-nut to suit, from $\frac{5}{16}$-in. brass rod, as shown.

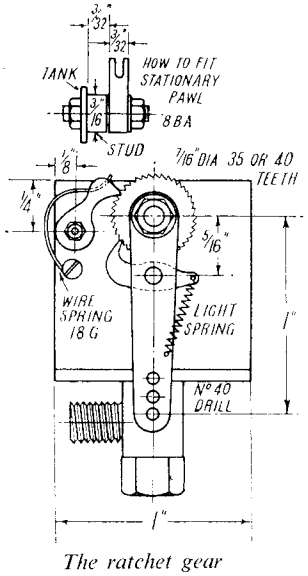
Check Valve or Clack

As the spigot at the bottom of the pump stand forms the ball seating, the body of the check valve consists merely of a $\frac{3}{8}$-in. length of $\frac{5}{16}$-in. round brass rod, with a 7/32-in. × 40 tapped hole right through it, and a 7/32-in. × 40 union nipple silver-soldered into the side. The cap is made from $\frac{5}{16}$-in. hexagon rod, screwed to fit, and drilled No. 30 to accommodate the spring, which is $\frac{1}{4}$ in. diameter, and wound up from 24-gauge tinned steel wire. Touch each end on the emery-wheel, running fast, before assembling as shown. The ball is seated by the usual tap; you can hit it direct with a soft-metal hammer, before fitting the stand into the tank.

To assemble the lubricator, attach the cylinder to the stand, and put the lot in the tank, with the spigot projecting through the hole in the tank bottom. Screw on the clack body temporarily, just tight enough to hold the stand in position. Put the bearing through the hole in side of tank, put the locknut on for a few threads, then line up the tapped hole in the top of the pump stand, with the bearing, and screw the latter into the



Section of lubricator



The ratchet gear

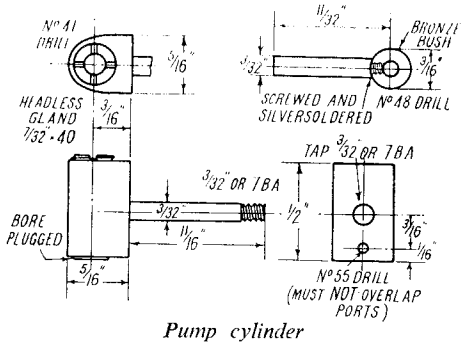
Crankshaft and Bearing

The crankshaft is a 1 9/32-in. length of 3/32-in. round steel, screwed at both ends and furnished with a disc crank. This is a $\frac{1}{8}$-in. slice of $\frac{5}{16}$-in. round rod, with a tapped hole in the middle for the shaft, and a $\frac{3}{8}$-in. length of 15-gauge spoke wire for the crankpin, screwed in at 3/32 in. full, from the hole until the head of the bearing just comes up against the tank, without in any way squeezing it in. Then run the locknut back against the side of tank, and tighten it. Screw the clack body tightly against the bottom of the tank, so that the union nipple points to the back; see view showing ratchet gear. *Don't strip the*

threads ; if it won't go, chuck in three-jaw and take a skim off the end. When O.K. put in the ball and spring, and screw the cap home. The spring should just start to compress as the threads engage.

Ratchet Gear

Our approved advertisers should be able to supply suitable ratchet wheels to the size given



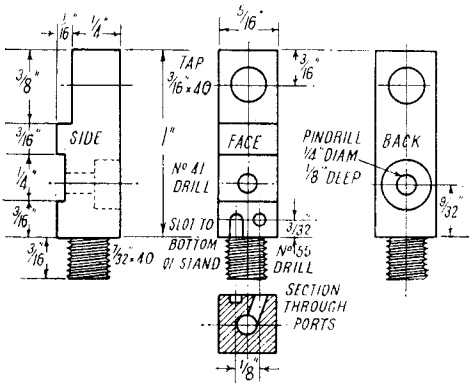
Pump cylinder

in the drawing. The exact size is not essential ; one a weeny bit larger or smaller will do, anything between about 30 and 40 teeth. My own early efforts had clock ratchets, and they are still doing the job. It is also quite easy to cut ratchet wheels on any ordinary lathe, the necessary rig-up being very simple ; maybe I will describe it in a future note. Drill the wheel No. 43, and carefully press it on the shaft, so that it is approximately $\frac{15}{16}$ in. from the crank end ; be mighty careful to have it on the right way, so that the buttress teeth are as shown in the illustration. Try it for location by putting the crankpin through the " big end " of the ram, holding the crank disc between the big end and the bearing, inserting the crank spindle, and screwing it home into the crank disc. When right home, there should be just the weeniest bit of end play. If too much, or not enough (causing the crank to jam) adjust wheel on spindle until you get the desired result. If the wheel is quite tight on the spindle, let it bide ; but if at all easy, and likely to shift, silver-solder it. You can then replace crank and spindle " for keeps."

The ratchet lever is filed up from $\frac{1}{16}$-in. × $\frac{1}{4}$-in. strip steel, and needs no detailing ; the end that goes on the spindle is drilled No. 41. The hole for the pin holding the moving pawl, is drilled No. 51 and tapped 8-B.A. The pawls themselves are filed up from odd scraps of 13-gauge (3/32-in.) steel. Cast steel, as used for gauge making, is the best, as the pawls can then be hardened. If mild-steel is used, they will need case-hardening, or they won't last the proverbial five minutes. Heat to bright red, dip in some good case-hardening powder (" Kasenit " or similar) reheat until the yellow flame dies away, and the powder fuses, then quench in cold water, and clean up. The moving pawl is attached to the lever by an 8-B.A. screw with 3/32 in. of " plain " under the head ; this can be turned from a bit of $\frac{3}{16}$-in. rod held in the three-jaw. The way I do mine, is to turn down about $\frac{3}{16}$ in length until the pawl will just slip on to it, then I put the pawl on, and run on the die until it touches the pawl. This gives the exact length of " plain " needed ; and when the screw is right home to the end of the thread, the pawl is free without being sloppy. The projecting part of the screw can be lightly riveted over to prevent it coming loose when the engine is running fast, and the ratchet gear working overtime.

The stationary pawl is filed to the shape of the bird's head as shown, and attached to the tank by a stud, turned from $\frac{3}{16}$ in. rod (see detail sketch) which props it out to the level of the ratchet wheel. Its own weight would normally keep it in engagement with the teeth of the wheel, but if any of the thick cylinder oil gets on the bearing, it will stick up ; so bend a bit of 18-gauge steel wire to the shape shown, loop the bottom end, and attach it to the tank by a screw, nutted inside the tank. The upper end of the spring rests in a groove filed in the bird's head. The lever, with moving pawl attached, can then be slipped over the spindle and secured by a commercial nut and washer. When the nut is tightened well up, the lever should be able to swing freely without any side play. A small spring wound up from thin steel wire, is attached to the tail of the pawl, and the lever, as shown, to keep the pawl in engagement.

To test the lubricator, put a drop of cylinder oil in it, and waggle the ratchet lever. When oil appears at the union on the check valve underneath, put your thumb over the union, and press as hard as you can ; then waggle the lever again. If the gadget has been properly made, it will be found impossible to prevent the



Pump stand

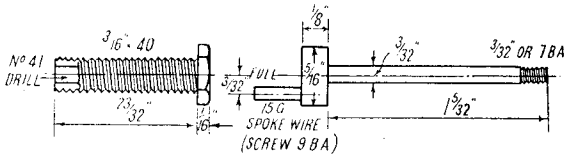
oil pushing your thumb away and escaping. These lubricators have been tested to pump against a pressure of 450 lb. per sq. in., in a full-size locomotive works.

How to Erect the Lubricator

Three illustrations are given, to make quite clear the way the lubricator should be erected and driven. To get access to the filler, same

must be placed so that it is clear of the " biscuit-tin " smokebox, and that entails fixing the oil tank close to the left-hand frame. At 1⅛ in. from the left-hand end of the front beam (" begorra, an' the lift's the roight whin ye're lookin' straight at ut ! " says Pat) and $\frac{3}{16}$ in. from the bottom, drill a No. 41 hole, and another $\frac{3}{4}$ in. away ; countersink both. Hold up the lubricator close to the frame, with the top of it level with the beam, as shown, and the thickening strip touching the beam. Run the drill through the holes, making countersinks on the strip ; remove, drill the countersinks No. 48, and tap 3/32 in. or 7 B.A. Replace lubricator, and secure with a couple of countersunk screws.

The method of driving is also clearly shown in both the plan and elevation. The drive rod is a piece of 3/32-in. silver-steel with a fork at the lubricator end, and a little brass block, like a little big-end (says Pat again) at the driving end. This can be filed up from an odd bit of $\frac{1}{8}$-in. brass, to the shape shown, drilled No. 30 to fit over the extension of the pump gudgeon pin, and drilled and tapped in the thickness, to take the drive rod. Alternatively, the block can be silver-soldered to the rod. The fork at the front end is made in the same way as the valve-spindle fork, using $\frac{3}{16}$-in. square rod, and slotting it



Crankshaft and bearing

$\frac{1}{16}$ in. to suit the ratchet lever. Drill the fork No. 53, tap one side 9 B.A. and open the other with No. 48 drill. The boss of the fork is drilled No. 48 and tapped 3/32 in. or 7 B.A. to suit the thread on the drive rod. The actual length of the latter is obtained from the actual job ; when the pump is at half-stroke, and the ratchet lever vertical, the distance between centres of pump gudgeon pin and the bottom hole in ratchet lever, is the length of the rod between the holes in the brass block and the fork, after the drive rod is bent to shape. The block is held on the gudgeon pin by a commercial nut and washer ; and the fork is connected to the ratchet lever by a 9-B.A. screw with a full $\frac{1}{4}$ in. of " plain " under the head, or better still by a bit of 15-gauge spoke wire with a nut on one end, and a thread on the other for screwing into the fork. The ratchet should click one tooth for each revolution of the wheels.

The G.N.R. " Centenaries Express "

This was a special train organised by three private enthusiasts, Messrs. A. F. Pegler, H. T. S. Bailey and L. J. W. Smith, and run to celebrate the centenary of the opening of the G.N.R. main line from Kings Cross to York *via* Grantham, Newark and Retford. The ten-coach train of some 380 tons gross weight and hauled by the A4-class Pacific locomotive, No. 60007, *Sir Nigel Gresley*, was very well filled, and we had the pleasure of attending to represent THE MODEL ENGINEER. The schedule allowed 195 minutes for a non-stop run over the 188 miles to York, which was a fairly tight time in view of anticipated delays owing to permanent way repairs in progress at various points on the way. The actual time was 193 minutes, and this included at least two severe p.w. checks, the usual slowing through Peterborough, Grantham and Selby, plus a dead stop of 2 minutes 50 seconds in the carriage sidings at Doncaster, through which we were diverted because there was no track through the station.

We had not anticipated that, during the run, certain members of the Press party would be invited to pass through, in turn, to enjoy rides on the engine, which was fitted with a corridor tender. Our turn came last, and probably because we were rather more experienced than others who had preceded us (!), it lasted longest ; the train was approaching Newark as we settled ourselves as comfortably as possible in the engine's roomy cab, and we stayed there until we were within four miles, or so, of York. During that time, we enjoyed some thrilling speeds ranging from 60 to 78 m.p.h. ; for several miles between Newark and Retford, the average was 77 m.p.h. The engine was riding somewhat roughly, but was otherwise in excellent trim, and she responded magnificently to the demands made on her by Engineman Simmons and Fireman Beslee, both of whom seemed to enjoy themselves as much as everyone else.

In York, we spent about three hours in the Railway Museum, which had been specially opened for the occasion, and then, about 4 p.m. returned to the train for the return to London, where we were due at 8.20. There was little opportunity for speed this time, but the route was intensely interesting being *via* Church Fenton, Knottingley, Doncaster, Retford, Gainsborough, Lincoln, Boston, Spalding and Peterborough, most unfamiliar to modern travellers between York and London, but it was practically the route of all trains before the " Towns Line " *via* Grantham was opened.

We thoroughly enjoyed every minute of the day, and met a lot of people whom we knew. The public interest displayed along the route was remarkable ; at one or two places, the size of the crowds suggested a royal occasion, and we soon lost count of the number of photographers present.

The organisers, railway officials and everyone else concerned in the manning and running of the train are to be warmly congratulated upon a most outstanding event.

PRACTICAL LETTERS

Notes on Parting Tools

DEAR SIR,—First, may I offer my congratulation to Mr. Latta for his notes on this subject. He tells us just what we want to know and there must be but few model engineers who will not be helped by the information he gives.

To those who are still finding difficulty with very deep cuts in "luggy" material, on lathes nothing like strong enough for the job, I would like to mention a trick which enabled me to part off a mild-steel bar of $2\frac{7}{8}$ in. diameter when defeat seemed inevitable.

The cutting edge of the tool was ground to the shape of an arrow head, the two equal parts being at about 150 deg. to each other. As the tool was fed in, the saddle was moved about 1/25 in., first to one side and then to the other, so that the width of the *cut* was reduced to half, and there was no rubbing at the sides till the diameter was reduced to less than half an inch. A hacksaw completed the job.

Yours faithfully,

Lymington. A. RICKARD TAYLOR.

The "Busy Bee" Engine

DEAR SIR,—In designing the "Busy Bee," Mr. Westbury has surely created a masterpiece, and I write not to criticise, but to offer a suggestion which would, in my opinion, extend its application very considerably.

The present crankcase is as perfect as could be for driving a pedal-cycle through a roller on its rear tyre, but could the designer be persuaded to produce an alternative crankcase to give a power take-off on both sides, one, of course, for the Bantamag?

This would very materially simplify the application of the motor to a mower or, mounted inboard, to a canoe or other light water-craft.

I did, in fact, enquire of the manufacturers of the castings, Messrs. Braid Bros. whether there is such alternative available, and during the conversation which ensued they indicated their willingness to co-operate in production and thought the two variations could be optional.

Yours faithfully,

Epsom. C. G. HOWARD.

DEAR SIR,—I am very gratified by the high opinion of the "Busy Bee" engine, expressed by Mr. C. Howard, which I may say, appears to be shared by most people who have built and used it, and I am also interested in his suggestions for producing it in a modified form. The idea of an alternative design, with a shaft extension on both sides of the crankcase, had already occurred to me, and I agree that it would have a greater range of utility for purposes other than cycle propulsion, but owing to pressure of work on other projects, I have not been able to carry out any practical work on such a design. One of the points to be considered is the method of mounting such an engine, as it is desirable that this should be as adaptable as possible, and I have not definitely decided between the alternatives of casting bearers on the crankcase, or arranging for the attachment of mounting plates or brackets. However, if there appears to be a general interest in extending the scope of the engine in this way, I shall be pleased to get down to it as soon as circumstances permit.

I would like to take this opportunity of thanking all readers who have written to me about the "Busy Bee," as their opinions and experiences have been invaluable. There have been a few complaints and criticisms, but I think these have been dealt with fairly satisfactorily. Thanks are also due to Messrs. Braid Bros. for the services rendered to constructors, in respect of which no complaints have been encountered, and for their co-operation with

Yours faithfully,

EDGAR T. WESTBURY.

Flash Steam Boilers

DEAR SIR,—I am interested in Mr. Ward's problem to find a material for a radiant core within a flash steam coil.

Pipeclay, fireclay and steatite suggest themselves; materials such as would be used for a muffle furnace, for that is in effect, what the flame chamber becomes.

I recall that quite a variety of star-shaped ceramic forms are made as a stock line for electrical heaters and cookers, and it may be that Mr. Ward would find something ready-made suitable in the stock lists of firms such as:

Steatite Insulations Ltd., 25, Somerset Road, Edgbaston, Birmingham.

Steatite & Porcelain Products Ltd., Stourport-on-Severn, Worcestershire.

Geo. Bray & Co. Ltd., Leicester Place, Leeds 2, Yorks.

Yours faithfully,

Bristol. W. D. ARNOT.

The Foster "Princess Marina"

DEAR SIR,—With reference to the note about "Traction Engines at Hull Docks" in Smoke Rings in THE MODEL ENGINEER of September 25th you ask for confirmation of a report about the Foster engine *Princess Marina*.

Although I cannot confirm the data, I can tell you the whereabouts of this engine as recently as September 26th. It is in a yard belonging to Drakeleys at Stetchford, Birmingham, with three other showman's engines, another Foster, a Burrel and, I think the third is a Wallis and Steevens. *Princess Marina* can be seen from the Ring Road, but judging by the grass growing amongst the works, she has not worked for a while. Her registration number is VL 6104, and she was last taxed in 1949.

I hope this information will be of interest.

Yours faithfully,

Heswall, Ches. K. C. GLEDHILL.

The "M.E." Tie

DEAR SIR,—Distrusting my own taste in ties, I have hitherto always "played safe" with the Regimental and the Old School kind. Any blame for the colour scheme in these does not rest upon my shoulders.

However, I bought one of the new "M.E." ties, and I suggest that there is a good deal to be said for it. It can be worn on almost any occasion—except a funeral—and whilst clearly recognisable by other enthusiasts, its meaning is sufficiently veiled to escape the would-be humorist among those many people who regard the builder of little engines as lucky to be at large instead of looking out at the world from inside the local looney bin.

I am quite certain that we pass by many people with similar interests and tastes who would be glad to get together and exchange ideas, simply because we don't realise that we share a common hobby. Sometimes, for instance, we find it out at the end of a long train journey, just as everyone is reaching for his suitcase.

I think you have really got something in this new tie, but only if a goodly number take to wearing it. The object of this letter is to suggest to others that they can safely do so.

Yours faithfully,

Llanddulas. D. R. RICHARDS.

Oscillating Engines

DEAR SIR,—The article on the above by H. E. Rendall is very interesting. The type of valve-gear shown in Fig. 1 is similar to a design described in the *Mechanics Magazine* for 1848 and there suggested for use on paddle-wheel engines. In 1875, the firm of Brinjes & Goodwin, of Whitechapel, appear to have marketed a series of little engines, mainly in the form of wall engines, and ranging in size from 4 in. bore to 8 in. bore, which had a similar type of valve-gear but arranged in each case for reversing. There appeared to be a mistaken idea that by shortening the valve travel in the intermediate positions of the link some degree of expansion was given, but the actual effect was mainly to reduce the port opening, though the already late admission was made slightly later and cut-off very slightly earlier, owing to the $\frac{1}{16}$ in. lap.

Many engines were made, particularly on the Continent, in which the valve, though operated entirely by the oscillation of the cylinder, did give an early cut-off. Alban, the German pioneer of high pressure steam, made oscillating engines of this type with very high ratios of expansion, as did Farcot and others in France. These engines, however, had no lead, and involved a loose expansion valve at the back of the main valve. Alban's engines were interesting also in the fact that he did not lead his steam and exhaust connections through the trunnion supporting the cylinder.

The picture of the ash hoist engine interested me, as the firm with whom I served my apprenticeship were at that time still making a few ash hoist engines having oscillating cylinders. These had two double-acting cylinders at right-angles, as shown, but the steam distribution was by port faces on the side of the cylinder, held up, as in small models, by a spring.

Yours faithfully,

Norwich. GEOFFREY K. KING.

CLUB ANNOUNCEMENTS

North Wales Model Engineering Society

We recently held our first full-dress exhibition in the Town Hall, Llandudno. The chairman of the Council very kindly opened the show for us, and he was supported by the Mayor of Conway. These gentlemen afterwards drove the first "train" to run on the 55-ft. track in the hall. The two main points about the proceedings were first that they were a great success and second that much of the success was due to the generous help and co-operation of other societies, notably the Deeside Club who not only lent us their track but turned up in force to do a lot of the locomotive work. Messrs. Mills, Devine, James and Hobson put in long hours driving for us. The Oswestry Society lent us several models and the Machynlleth Society most sportingly came 120 hilly miles with a nice display of members' work.

The locomotive element predominated. So many engines were shown that it was possible to arrange them in three groups, a representative show of engines which have worked the North Wales line from the "Lady of the Lake" class down to Class 5s, a nice display of L.N.E.R. locomotives, and a selection of "L.B.S.C.'s," *Tich* predominating. Mr. Tucker lent his beautiful *Lady Anna*, but we are rather far off the Southern and so she was given a place of honour by herself on the stage. Several models were shown working beside her under compressed air, supplied by a plant made by our member, Mr. Churn. Mr. Griffiths' (Welshpool) perfect model of a Clayton & Suttleworth threshing machine driven by a traction engine of the period was very much admired, even by a non-farming audience.

The ship model section, whilst not so numerous included a wide variety of types and an unusual subject for modelling, a German destroyer, and an old battleship of the "Koenig" 1915 class. Messrs. Nadins, with Mr. Mellor's co-operation, showed a novelty in the shape of a "OO" gauge hump—shunting yard which worked perfectly and made a welcome change from the standard circular track. Mr. Mellor also showed in operation a small layout which had been made for a customer.

Hon. Secretary: D. J. R. RICHARDS, Cwymp Mill, Llanddulas, nr. Abergele, North Wales.

The Junior Institution of Engineers

Friday, November 7th at 7 p.m. Townsend House, Greycoat Place, S.W.1. Film evening, "New Esso Refinery" Part I, "New Esso Refinery" Part II. "The Long Road" introduced by Mr. C. W. Odell.

Sheffield and District Local Section, Monday, November 10th at 7.30 p.m., at Livesey Clegg House (opposite Union Street Cinema) Sheffield. President's address "Smoke Abatement" by Prof. R. J. Sarjant, O.B.E., D.Sc., A.R.C.S.

Friday, November 14th at 7 p.m. Townsend House, Greycoat Place, S.W.1. Ordinary meeting, Chairman's address "Water Supply and Distribution" by N. E. Pillinger (member).

Saturday, November 15th, annual dance at Caxton Hall, Westminster, S.W.1.

Friday, November 21st at 7 p.m. Townsend House, Greycoat Place, S.W.1. Joint meeting with The London Steam Engineers' Circle, Paper: "Some Comparisons Between Shell and Water Tube Boilers" by J. N. Williams.

Meteor Model Race Car Club

The club will be holding its annual open event on Sunday, November 16th, 1952, in the canteen of Messrs. Rists Wires & Cables Ltd., Milehouse, Newcastle, Staffs. In view of the high speeds obtained today, and the small track available, in the interests of safety, the club has decided to run the 10 c.c. class only as an all British event. We feel sure that it will be appreciated that this is done in the best interests of all concerned.

There will be four classes of entry as follows:

Class 1. Cars up to 1.5 c.c.
Class 2. Cars over 1.5 c.c. and up to 2.5 c.c.
Class 3. Cars over 2.5 c.c. and up to 5 c.c. (British and non-British).
Class 4. All British cars over 5 c.c. and up to 10 c.c.

The track will be available for practice from 10.30 a.m., racing to commence at 1.30 p.m. prompt, beginning with the 1.5 c.c. class.

Hon. Secretary: NORMAN STANTON, 44, Peel Terrace Stafford.